"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

GERNER, G. [Herner, Heinrich]; FERKHOVSEK, R. [Verhovsek, Rudolf]; VELLER, E. L. [translator]; RYKACHEV, Yu. V., redaktor; TROFIMOV, A.V., tekhnicheskiy redaktor

[Design and equipment of merchant vessels. Translated from the German] Proektirovanie i oborudovanie torgovykh sudov. Perevod s nemetskogo E.L. Veller. Pod red. IU.V. Rykacheva. Moskva, Izd-vo "Morskoi transport," 1956. 322 p. (MLRA 10:5)
(Merchant ships)

APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5"

"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

ROGOZINSKI, Ryszard; RYKALA, Iza

Effect of cocarboxylase hydrochloride combined wit. chlorpropamide and insulin on the sugar tolerance curve in juvenile diabetes. Endocr. Pol. 16 no.1:47-54 Ja-F'65

1. II Klinika Chorob Wewnetrznych Wojskowej Akademii Medycznej w Lodzi (Kierownik: doc. dr. J.R. Chojnowski).

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

RYKALEVA, A. M. PA 21T99

USSR/ Medicine - Saccharides Jun/Aug 1947
Medicine - Proteins

"The Specific Polysaccharide Complexes of Macroorganisms," A. M. Kuzin, I. S. Buyanovskays, A. M. Rykaleva, N. I. Kuzina, Laboratory of Immunology, Institute of Biological Prophylaxy of Infections, Moscow, 10 pp

"Biokhimiya" Vol XXI, No 4

Polysaccharide complexxs are isolated by special methods, from tissues of guinea pigs, white mice and human tissues. Investigation shows: Polysaccharide protein complexes amount to 0.2 - 1.0% of weight of dry tissue; they have antigenic properties; dilutions of even 2:105 can be tested by senologic reactions, for the presence of such complexes.

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

RYKALEVA, A.M.

YERMOL'YEVA, Z.V.; VALEDINSKAYA, L.K.; AZLETSKAYA, A.Ye; RYKALEVA, A.M.

Experimental studies on ekmolin. Tr. Akad. med. nauk SSSR. Vol.22:7-14 1952 (CIML 25:5)

1. Professor, Corresponding Member Academy of Medical Sciences USSR for Yermol'yeva; Candidate Biological Sciences for Valedinskaya; Candidate Medical Sciences for Azletskaya and Chertkov.

APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5"

"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

RYKALEVA, A.M.

YERMOL'YEVA, Z.V.; VALEDINSKAYA, L.K.; LAZAREVA, K.N.; AVTSYN, A.P.; AZLETSKAYA, A.Yu.; BEREZINA, Ye.K.; RAVICH, B.V.; RYKALEVA, A.M.; GUSLOVA, A.M.

Experimental studies on protein-free preparations from the liver and thyroid gland. Tr. Akad. med. nauk SSSR. Vol.22: 14-21 1952. (CIML 25:5)

APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5"

"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

LAZAREVA, Ye.N.,; PETROVA, M.A.,; AVTSYN, A.P.,; BEREZINA, Ye.K.,; SEMICH, A.I.,; RYKALEVA, A.M.,; AVER'YANOVA, L.L.,; GLAGOVSKAYA,R.S.

Sodium salt of biomycin. Antibiotiki, Moskva 9 no.2:3-6 Mar-Apr 56 (MLRA 9:3)

1. Otdel eksperimental'noy terapii (zav.-chlen-korrespondent AMN SSSR prof. Z.V. Yermol'yeva) Vsesoyuznogo nauchno-issledovatel'skogo instituta antibiotikov.

(CHLORTETRACYCLINE
sodium salt, pharmacol.)

APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5"

"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

LAZAREVA, Ye.N.; BELOZEROVA, O.P.; AVER'YANOVA, L.L.; RYKALEVA, A.M.

Dibiomycin -- a chlortetracycline for prolonged activity. Antibiotiki 6 no.10:863-867 O '61. (MIRA 14:12)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut antibiotikov.
(AUREOMYCIN)

APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5"

"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

RYKALIN, I.D.; BELOV, L.N.

Processes of the local heating of steel sheets with flat inductors. Trudy Sektsii po nauchnoi razrabotke problem elektrosvarki i elektrotermii Akademii nauk SSSR, no.2:140-163 '53. (MLRA 7:6)
(Welding)

APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5"

"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

RYKALIN, I. K.

RYKALIN, I. K.: "The problem of treating long-unhealing wounds and ulcers of the shin." Min Health RSFSR. Saratov State Medical Inst. Saratov, 1956. (Dissertion For the Degree of Candidate in Medical Sciences.)

Knizhnaya letopis', No. 39, 1956. Moscow.

APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5"

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L 34068-65 EPF(c)/EPF(n)-2/EPR/EPA(s)-2/EPA(w)-2/EWP(k)/EWA(c)/EWT(m)/EPA(bb)-2/EWP(b)/T/EWP(e)/EWP(v)/EWP(t) Pf-4/Pq-4/Pr-4/Ps-4/Pt-10/Pu-4/Pab-10 WH/WW/JD/HM/JG

ACCESSION NR: AP5007604 S/0363/65/001/001/0029/0036

AUTHOR: Rykalin, N. N.; Shorshorov, M. Kh.; Krasulin, Yu. L.

TITLE: Physical and chemical problems of joining different materials

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 1, no. 1, 1965, 29-36

TOPIC TAGS: welding, welding energy, welding theory, ceramic welding, glass welding, radiation welding

ABSTRACT: In a general review of the literature, the authors examine the theoretical aspects of controlling the joining of different solids by welding through a proper selection of temperature, time of phase contact, value of local plastic-elastic deformation, and the time of radiation. The process of joining two different materials is divided into 2 principal stages. In case of joining different materials, one of which is in the molten state, the relaxation period of the interphase energy, during which the diffusion is retarded, must be considered. Particular attention is paid to the welding of metals with glass or ceramics (e.g., Al with silica) and the welding of solid Ti with liquid Al. The authors conclude that these processes require a regulatable energy source to control the type of bond

Card 1/2

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ACCESSION NR: AP5007604

produced, but that more research is needed on the nature of the energy characteristics of the joining process and the development of processes using thermal, mechanical and radiation activation. Orig. art. has: 3 figures and 2 formulas.

ASSOCIATION: Institut metallurgii im. A.A. Baykova (Metallurgical institute)

SUBMITTED: 16Sep64 ENCL: 00 SUB CODE: IE, MM

NO REF SOV: 010 OTHER: 003

Card 2/2

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L 7073-66 EWA(k)/FBD/EWT(l)/EWT(m)/EEC(k)-2/EWP(v)/T/EWP(t)/EWP(k)/EWP(b)/
ACC NR: AP5028279 EWA(h)/EWA(c)/ SOURCE CODE: UR/0020/65/165/002/0319/0322
EWA(m)-2 SCTB/IJP(c) WG/JD/HM/HW

AUTHOR: Rykalin, N. N. (Corresponding member AN SSSR); Uglov, A. A.

ORG: Institute of Metallurgy im. A. A. Baykov (Institut metallurgii)

TITLE: Heating of thin sheets during laser welding

SOURCE: AN SSSR. Doklady, v. 165, no. 2, 1965, 319-322

TOPIC TAGS: welding, heat conduction, laser application

ABSTRACT: The authors point out that when small or thin articles (sheet metal) are contact-welded with a laser beam, it is no longer possible to regard the welded spot as a mathematical point, and a correct analysis of the heating of the part by the laser beam calls for allowance for the finite thickness of the welded sheet, the distribution of the energy in the laser beam, and the heat transfer to the lower sheet through the contact surface. The heat conduction differential equations are formulated under the assumption that the welded spot is radially symmetrical about the center, and that the absorption of the laser beam takes place in a thin surface layer (approximately equal to the wavelength of the incident light, i.e., 0.7 μ for a ruby laser), so that the absorption can be regarded as being of the surface type if the spot diameter is 25 μ and the sheet thickness not less than 50—70 μ. Solution of the differential equation yields an expression for the temperature field from which it is possible to determine the energy of a single laser pulse necessary to effect welding without splashing of the material from the melting zone. As examples, the authors

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ACC NR: AP5028279

calculate the temperature field and the laser-pulse energy for welding of copper sheets of varying thickness. The effect of the Biot number on the results is discussed briefly. Orig. art. has: 13 formulas and 1 table. [02]

SUB CODE: MM, IE/ SUBM DATE: 17Aug65/ ORIG REF: 002/ OTH REF: 002
ATD PRESS: 4143

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Card 2/2

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

RYKALIN, N.N.; KRASOVSKIY, A.I., kand. tekhn. nauk

Eighteenth Congress of the International Institute of Welding. (MIRA 18:10)
Svar. proizv. no.10:43-44 O '65.

1. Chlen-korrespondent AN SSSR (for Rykalin).

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

RYKALIN, Il'ya Kuz'mich

Of the Question about the Lengthy Treatment of the (nezazhivayu-shchikh) injuries and Ulcer Shank.

Dissertation for candidate of a Medical Science degree. Chair of Hospital Surgery (head, Prof. A.N. Spiridonov) Saratov Medical Institute, 1957

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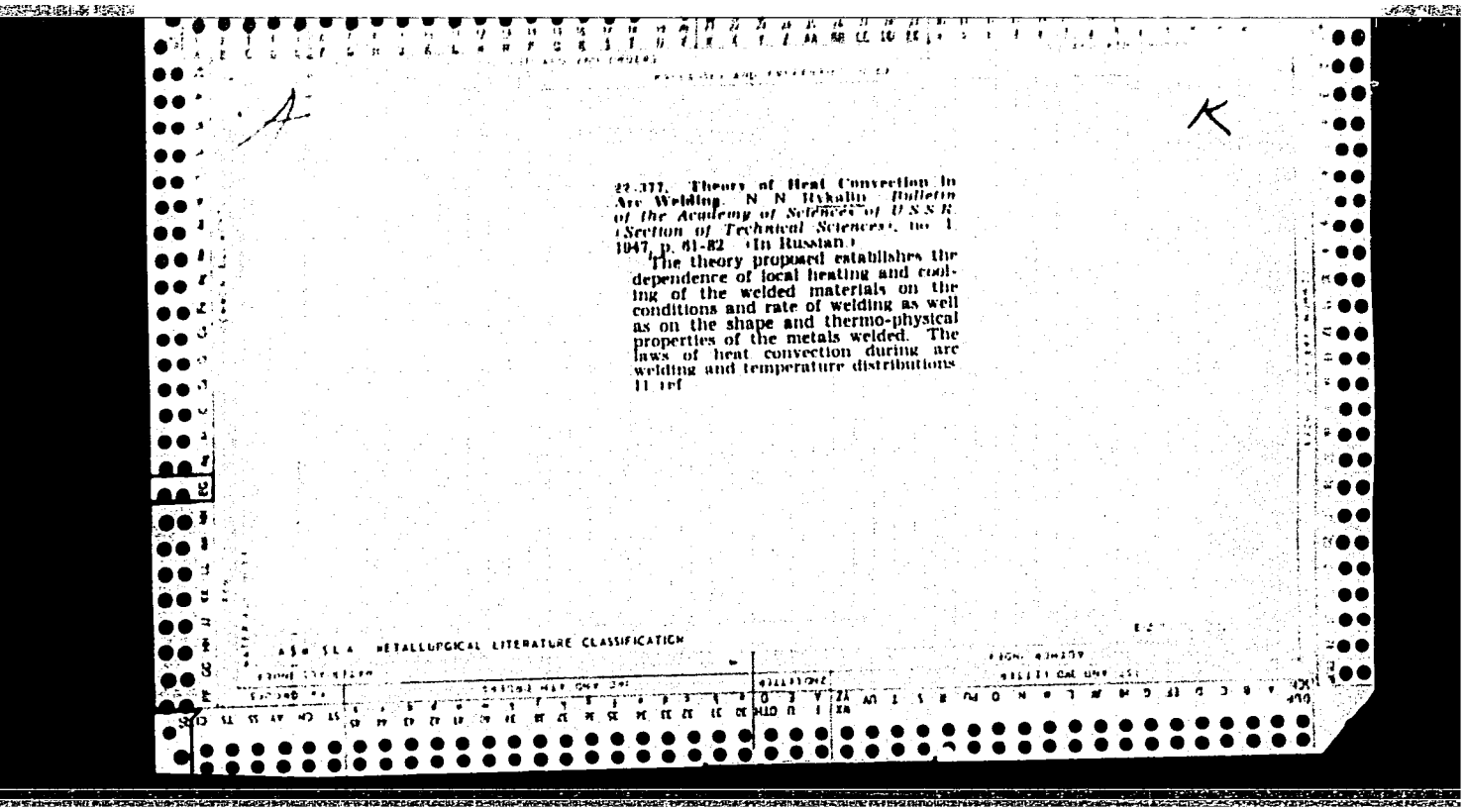

22-377. Theory of Heat Convection in Arc Welding. N N Rykalin. *Bulletin of the Academy of Sciences of U.S.S.R. (Section of Technical Sciences)*, no. 1, 1947, p. 81-82. (In Russian.)

The theory proposed establishes the dependence of local heating and cooling of the welded materials on the conditions and rate of welding as well as on the shape and thermo-physical properties of the metals welded. The laws of heat convection during arc welding and temperature distributions. 11 ref.

ASM SLA METALLURGICAL LITERATURE CLASSIFICATION

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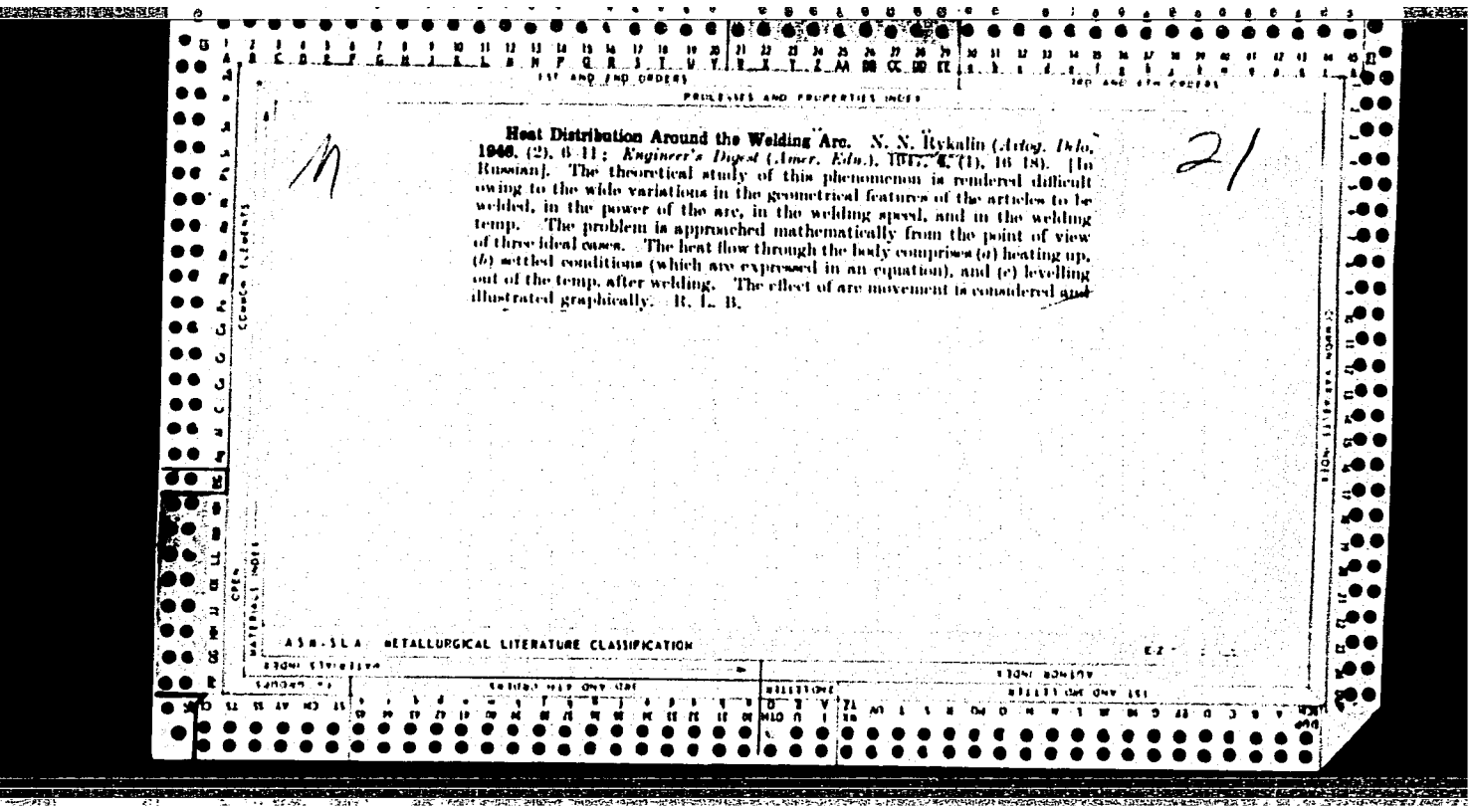

Heat Distribution Around the Welding Arc. *N. N. Rykalin* (*Avtog. Delo*, 1946, (2), 6–11; *Engineer's Digest* (*Amer. Edn.*), 1947, **8**, (1), 16–18). [In Russian]. The theoretical study of this phenomenon is rendered difficult owing to the wide variations in the geometrical features of the articles to be welded, in the power of the arc, in the welding speed, and in the welding temp. The problem is approached mathematically from the point of view of three ideal cases. The heat flow through the body comprises (*a*) heating up, (*b*) settled conditions (which are expressed in an equation), and (*c*) levelling out of the temp. after welding. The effect of arc movement is considered and illustrated graphically. R. L. B.

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

Weldability of low-alloyed steel SKhL-2. N. N. Rykalin and L. A. Fridlyand. *Avtogennoe Delo* 1947, No. 9, 1–8; *Chem. Zentr.* 1947, II, 1025.—The structural steel SKhL-2 produced in Russia contains C 0.14–0.22, Mn 0.61–0.77, Si 0.39–0.48, Cr 0.59–0.67, Ni 0.42–0.68, Cu 0.28–0.44, Mo 0.07–0.08, S 0.02–0.03, and P 0.028–0.039%. When plates of this steel 6–18 mm. thick were welded without preheating there was no tendency to crack formation even at winter temps. of −22°. Results obtained in welding this steel by various methods are reported.

M. G. Moore

APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5"

"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

RYKALIN, N. N.

A Theory of the Propagation of Heat in Arc Welding. Vest. AN SSSR. Ser. Khim., Vol 50, Sep 1947.

APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5"

"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

RYKALIN, N. N.

Welding of high-grade structural steel Moskva, Stroivoenmorizdat, 1946. 73 p.
(49-51234)

TK4660.R9

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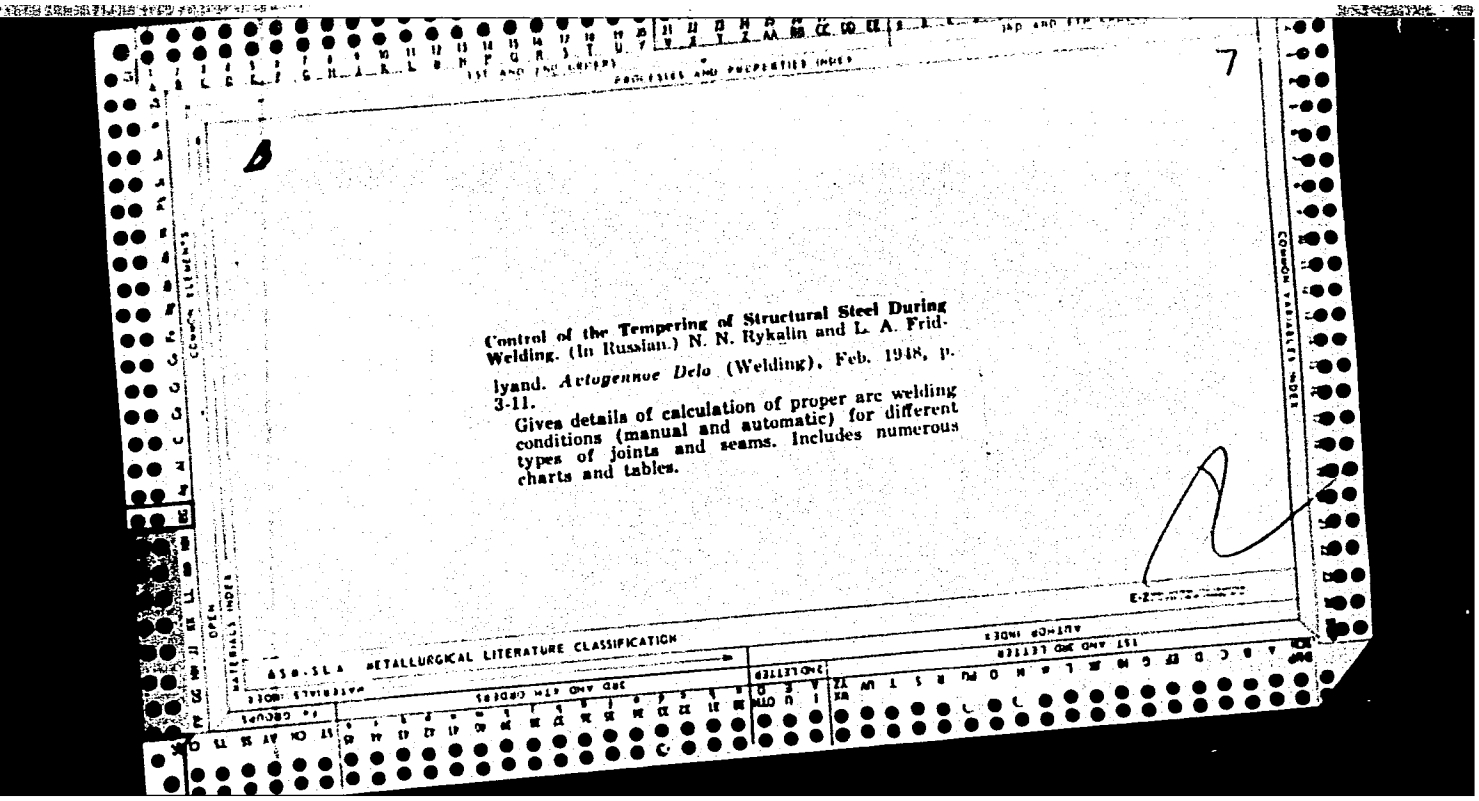

Control of the Tempering of Structural Steel During Welding. (In Russian.) N. N. Rykalin and L. A. Fridlyand. *Avtogennoe Delo* (Welding), Feb. 1948, p. 3-11.

Gives details of calculation of proper arc welding conditions (manual and automatic) for different types of joints and seams. Includes numerous charts and tables.

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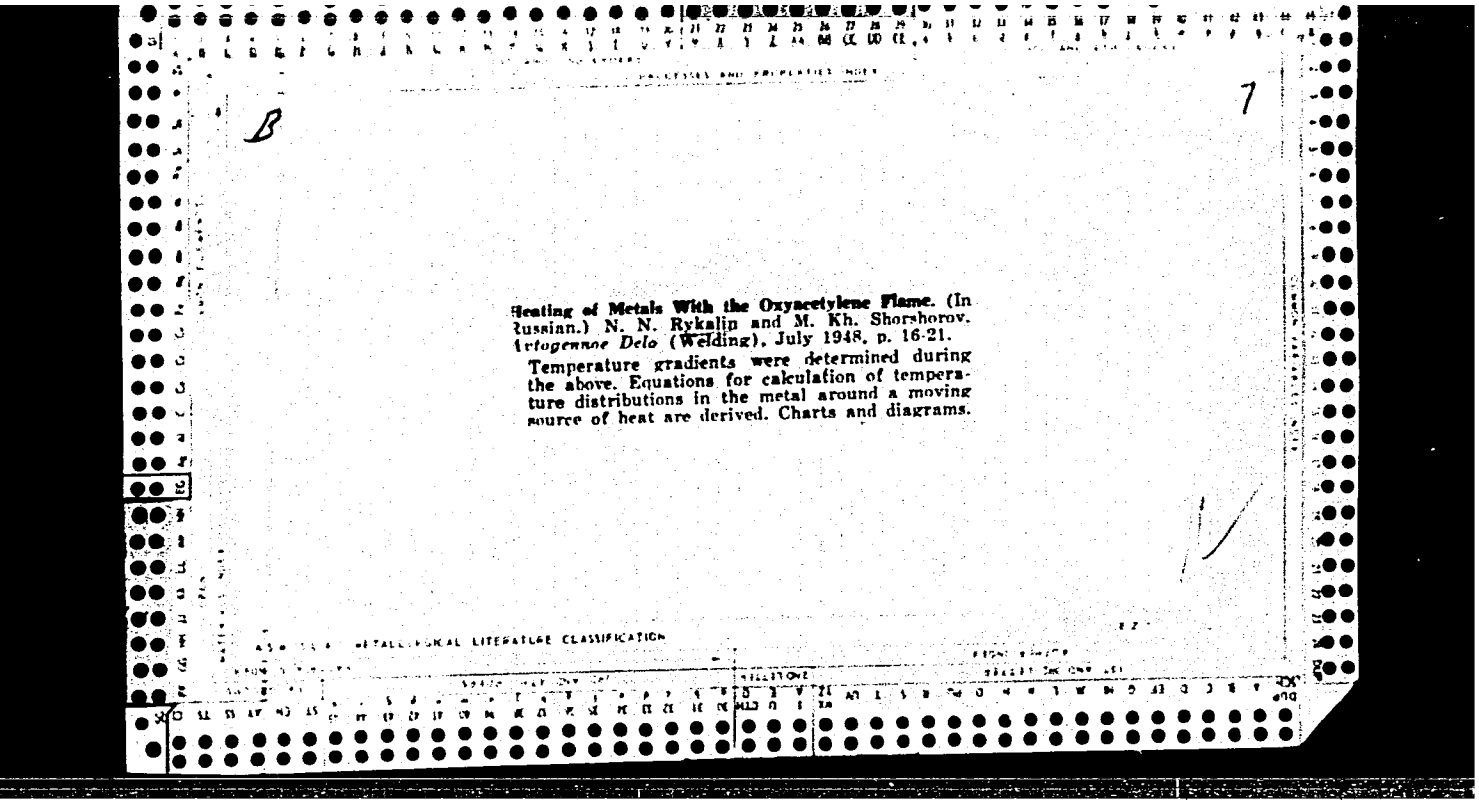

Heating of Metals With the Oxyacetylene Flame. (In Russian.) N. N. Rykalin and M. Kh. Shorshorov. *Avtogennoe Delo* (Welding), July 1948, p. 16-21.

Temperature gradients were determined during the above. Equations for calculation of temperature distributions in the metal around a moving source of heat are derived. Charts and diagrams.

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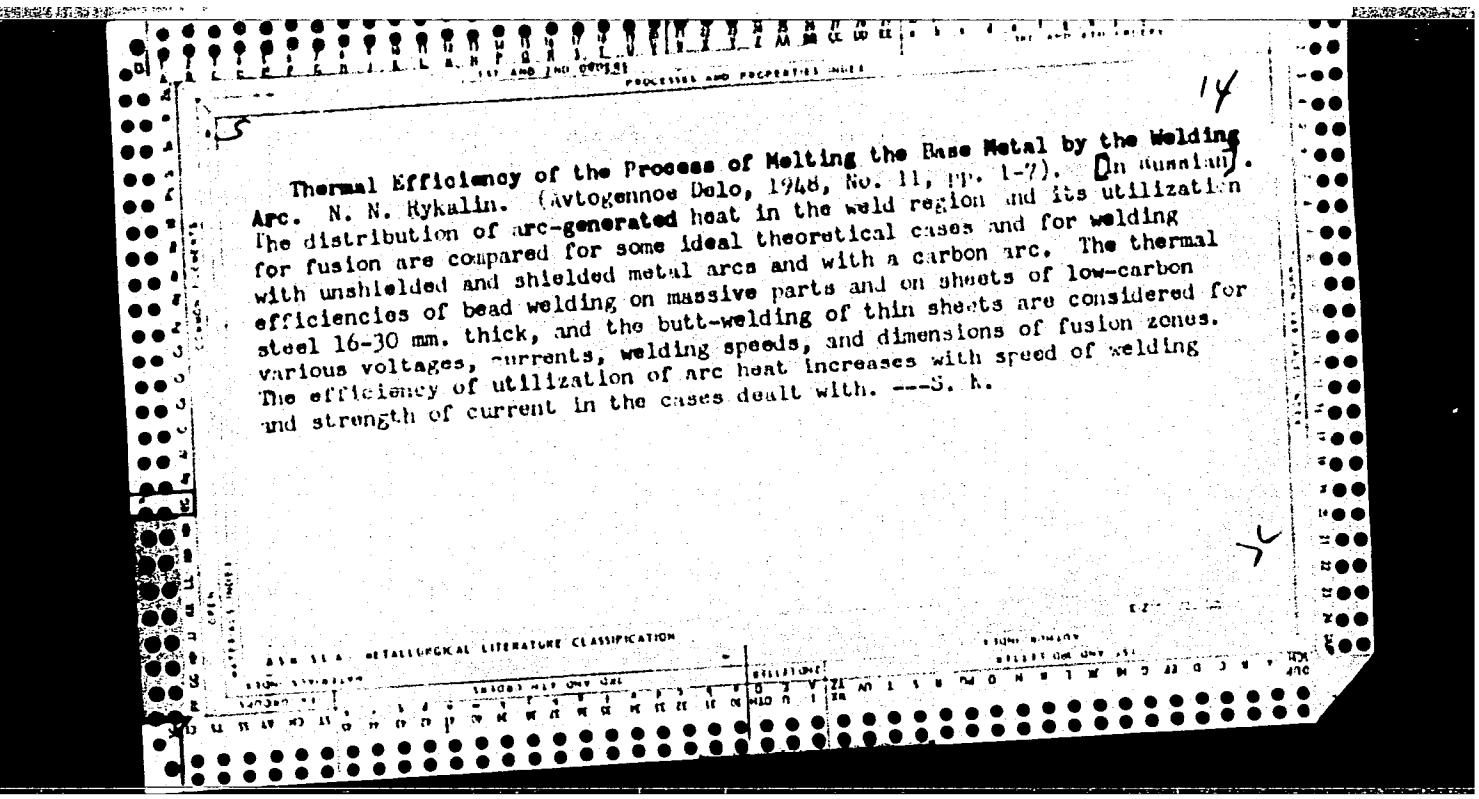

14

Thermal Efficiency of the Process of Melting the Base Metal by the Welding Arc. N. N. Rykalin. (Avtogennoe Delo, 1948, No. 11, pp. 1-7). (In Russian). The distribution of arc-generated heat in the weld region and its utilization for fusion are compared for some ideal theoretical cases and for welding with unshielded and shielded metal arcs and with a carbon arc. The thermal efficiencies of bead welding on massive parts and on sheets of low-carbon steel 16-30 mm. thick, and the butt-welding of thin sheets are considered for various voltages, currents, welding speeds, and dimensions of fusion zones. The efficiency of utilization of arc heat increases with speed of welding and strength of current in the cases dealt with. ---S. h.

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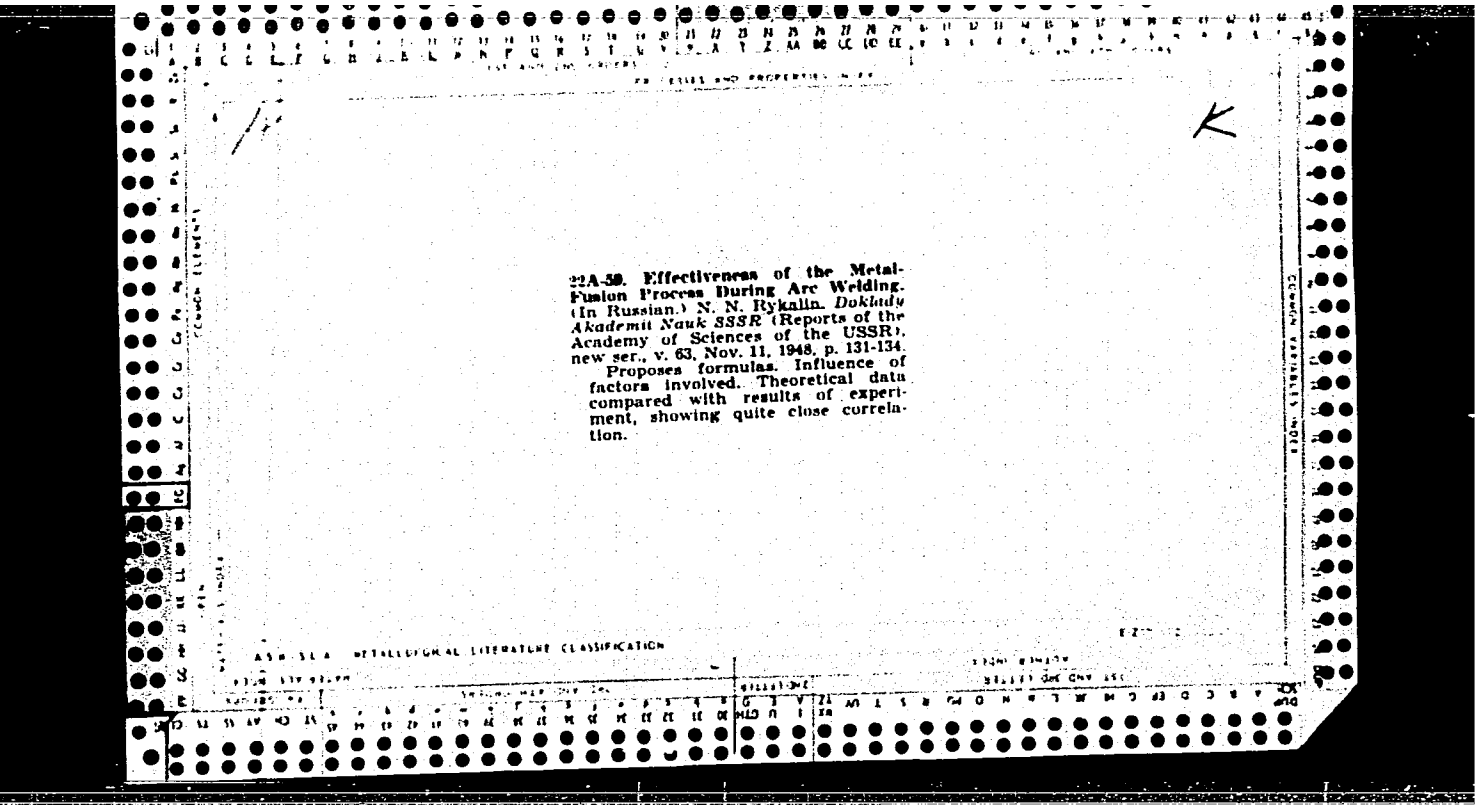

22A-59. **Effectiveness of the Metal-Fusion Process During Arc Welding.** (In Russian.) N. N. Rykalin. *Doklady Akademii Nauk SSSR* (Reports of the Academy of Sciences of the USSR), new ser., v. 63, Nov. 11, 1948, p. 131-134.

Proposes formulas. Influence of factors involved. Theoretical data compared with results of experiment, showing quite close correlation.

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

RYKALIN, N. N. and ALEKSEYEV, Ye. K.

"Stresses and Deformations in Welding," MVTU (Moscow Higher Technical School), Mashgiz, 1949.

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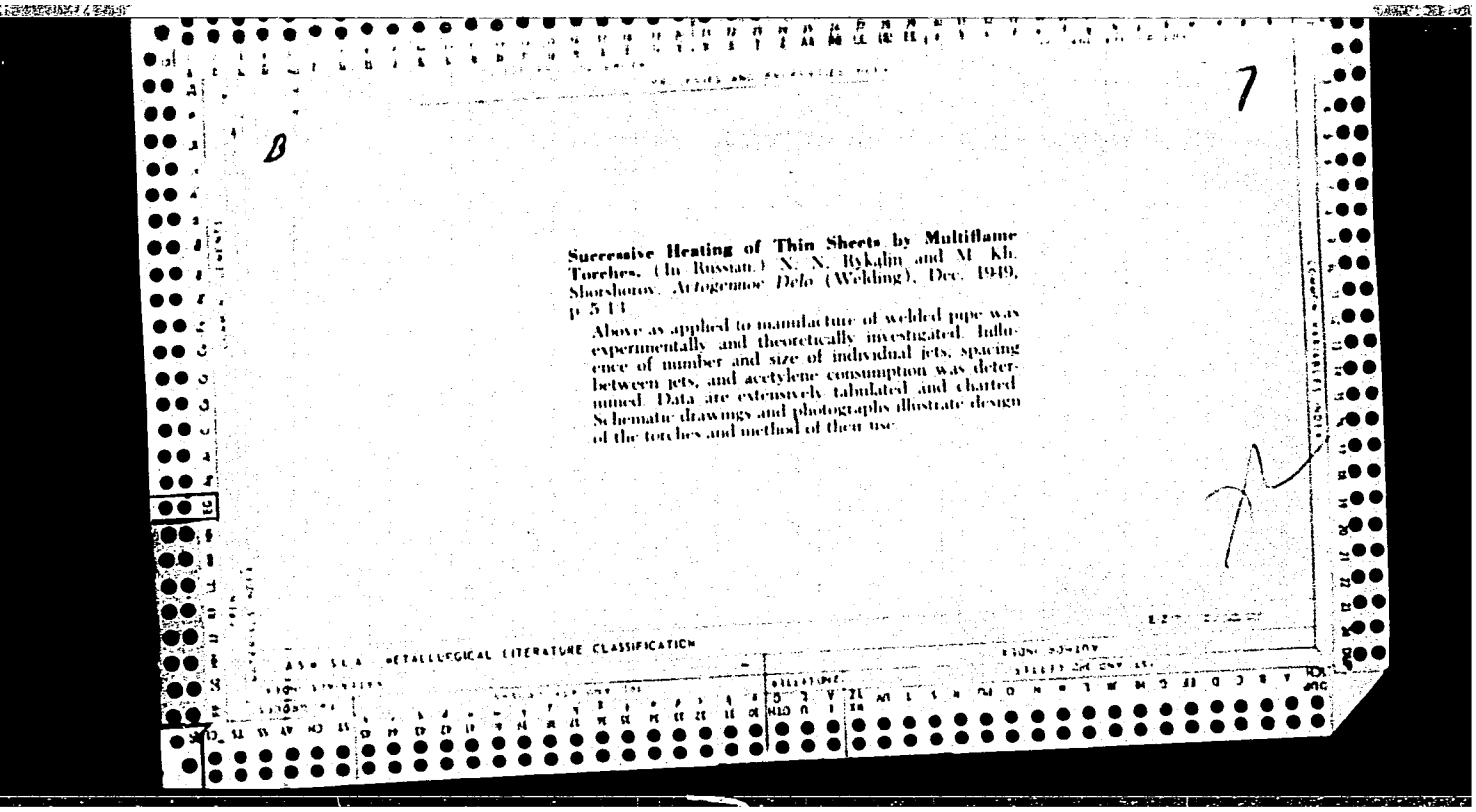
"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5



Successive Heating of Thin Sheets by Multiflame Torches. (In Russian.) N. N. Rykalin and M. Kh. Shorshorov. *Avtogennoe Delo* (Welding), Dec. 1949, p. 5-13.

Above as applied to manufacture of welded pipe was experimentally and theoretically investigated. Influence of number and size of individual jets, spacing between jets, and acetylene consumption was determined. Data are extensively tabulated and charted. Schematic drawings and photographs illustrate design of the torches and method of their use.

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RYKALIN, N. N. (Prof)

PA 1/50T29

USSR/Engineering - Constructions, Welded — Sep 49

Structures, Strength of

"Conference of VNITOS (All-Union Scientific Research Engineering Society of Welders) Concerning the Strength of Welded Constructions," Prof N. N. Rykalin, Dr Tech Sci, Pres of Conference, ½ p

"Avtogen Delo" No 9

Summarizes main papers, which were read by Prof Dr G. A. Nikolayev, (Moscow Higher Tech School imeni Bauman), Prof Dr N. O. Okerblom,

[redacted] 1/50T29

USSR/Engineering - Constructions, Welded (Contd) — Sep 49

(Leningrad Polytech Inst imeni Kalinin) and I. V. Kudryavtsev, Cand Tech Sci (Cen Sci Res Inst of Technol and Mach Const). S. Ye. Sinadskiy, Engr (Cen Sci Res Inst of Technol and Mach Const), Prof Ye. M. Kuzmak, Dr Tech Sci (Moscow Petroleum Inst) and B. N. Duchinskiy, Cand Tech Sci (Cen Sci Res Inst, Min of Transp) took part in discussion. Lists resolutions of VNITOS Sci Res Committee.

[redacted] 1/50T29

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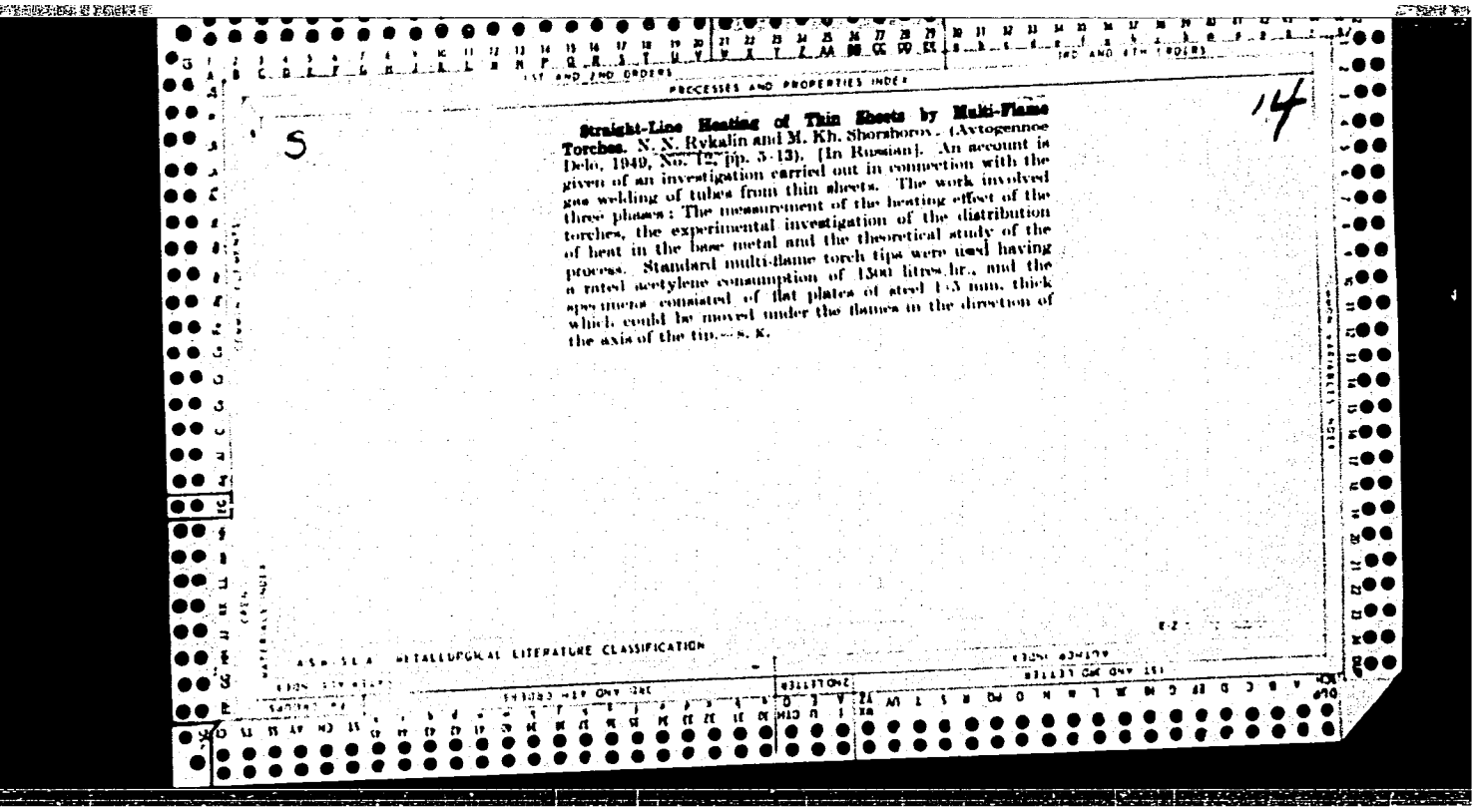

PROCESSES AND PROPERTIES INDEX

14

Straight-Line Heating of Thin Sheets by Multi-Flame Torches. N. N. Rykalin and M. Kh. Shorshorov. (Avtogennoe Delo, 1949, No. 12, pp. 5-13). [In Russian]. An account is given of an investigation carried out in connection with the gas welding of tubes from thin sheets. The work involved three phases: The measurement of the heating effect of the torches, the experimental investigation of the distribution of heat in the base metal and the theoretical study of the process. Standard multi-flame torch tips were used having a rated acetylene consumption of 1500 litres/hr., and the specimens consisted of flat plates of steel 1-3 mm. thick which could be moved under the flames in the direction of the axis of the tip.—S. K.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

RYKALIN, N. N.

PA 161T103

USSR/Metals - Welding, Arc **Jan** 50

"Thermal Cycle in the Main Metal During Multi-laminar Arc Welding," N. N. Rykalin, I. D. Kulagin, Sec on Sci Treatment of Problems in Elec Welding and Electrothermy, Acad Sci USSR, 20 pp

"Iz Ak Nauk SSSR, Otdel Tekh Nauk" No 1

Studies structure of main metal lying close to weld during actual thermal cycle of welding (very rapid heating up to melting temperature followed by rapid cooling), for various kinds of welds (V-shape, butt, lap, etc., welds).

[redacted] 161T103

USSR/Metals - Welding, Arc (Contd) **Jan** 50

Includes graphs of temperature (0-1,2000T) versus time, for various combinations of intermittent periods of welding and cooling and for various kinds of welds, to find optimum welding condition. Submitted 22 Jul 49 by Acad V. P. Nikitin.

[redacted] 161T103

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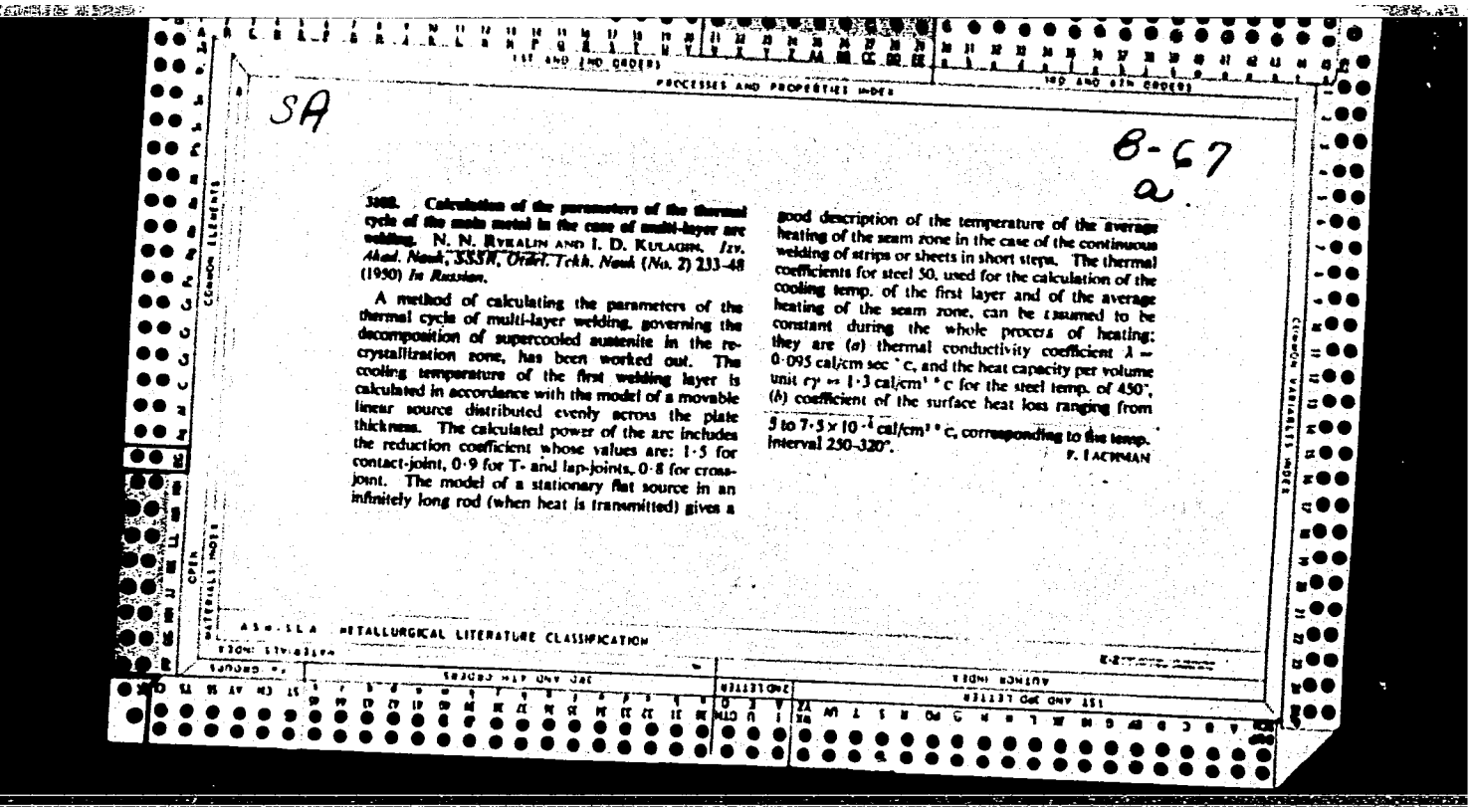

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8-67
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3008. **Calculation of the parameters of the thermal cycle of the main metal in the case of multi-layer arc welding.** N. N. RYKALIN AND I. D. KULAGIN. *Izv. Akad. Nauk, SSSR, Otdel. Tekh. Nauk* (*No.* 2) 233–48 (1950) *In Russian.*

A method of calculating the parameters of the thermal cycle of multi-layer welding, governing the decomposition of supercooled austenite in the re-crystallization zone, has been worked out. The cooling temperature of the first welding layer is calculated in accordance with the model of a movable linear source distributed evenly across the plate thickness. The calculated power of the arc includes the reduction coefficient whose values are: 1·5 for contact-joint, 0·9 for T- and lap-joints, 0·8 for cross-joint. The model of a stationary flat source in an infinitely long rod (when heat is transmitted) gives a good description of the temperature of the average heating of the seam zone in the case of the continuous welding of strips or sheets in short steps. The thermal coefficients for steel 50, used for the calculation of the cooling temp. of the first layer and of the average heating of the seam zone, can be assumed to be constant during the whole process of heating: they are (*a*) thermal conductivity coefficient λ = 0·095 cal/cm sec °c, and the heat capacity per volume unit $c\gamma$ = 1·3 cal/cm³ °c for the steel temp. of 450°, (*b*) coefficient of the surface heat loss ranging from 5 to 7·5 × 10⁻⁴ cal/cm² °c, corresponding to the temp. interval 250–320°.

P. I. ACHINIAN

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

RYKALIN, N. N. and ALEKSEYEV, Ye. K.

"Straightening Welded Structures made of Fine Sheets," Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk. No. 3, 1950, pp. 451-476.

APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5"

"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

RYKALIN, N. N. and ALEKSEYEV, Ye. K.

"Deformation of Sidewall Casings of 25-Meter Railroad Cars During Spot Welding," Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, No. 3, 1950, pp. 451-476.

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

RYKALIN, N. N., Prof

PA 167T74

USSR/Metals - Welding **Sep 50**

"Influence of Some Welding Parameters on the Effective Power of Oxyacetylene Flame," Prof N. N. Rykalin, Dr Tech Sci, M. Kh. Shorshorov, Engr, Sec of Elec Welding and Electrothermics, Acad Sci USSR, Moscow Higher Tech School imeni Bauman

"Avtogen Delo" No 9, pp 9-11

Investigates effect of heating conditions on effective power of oxyacetylene flame (addition to data published in "Avtogen Delo" No 7, 1948). Increase of effective power is not proportional

167T74

USSR/Metals - Welding (Contd) **Sep 50**

to consumption of acetylene. Efficiency of flame decreases from 77 to 26% with increase in acetylene consumption from 140 to 2,630 l/hr.

167T74

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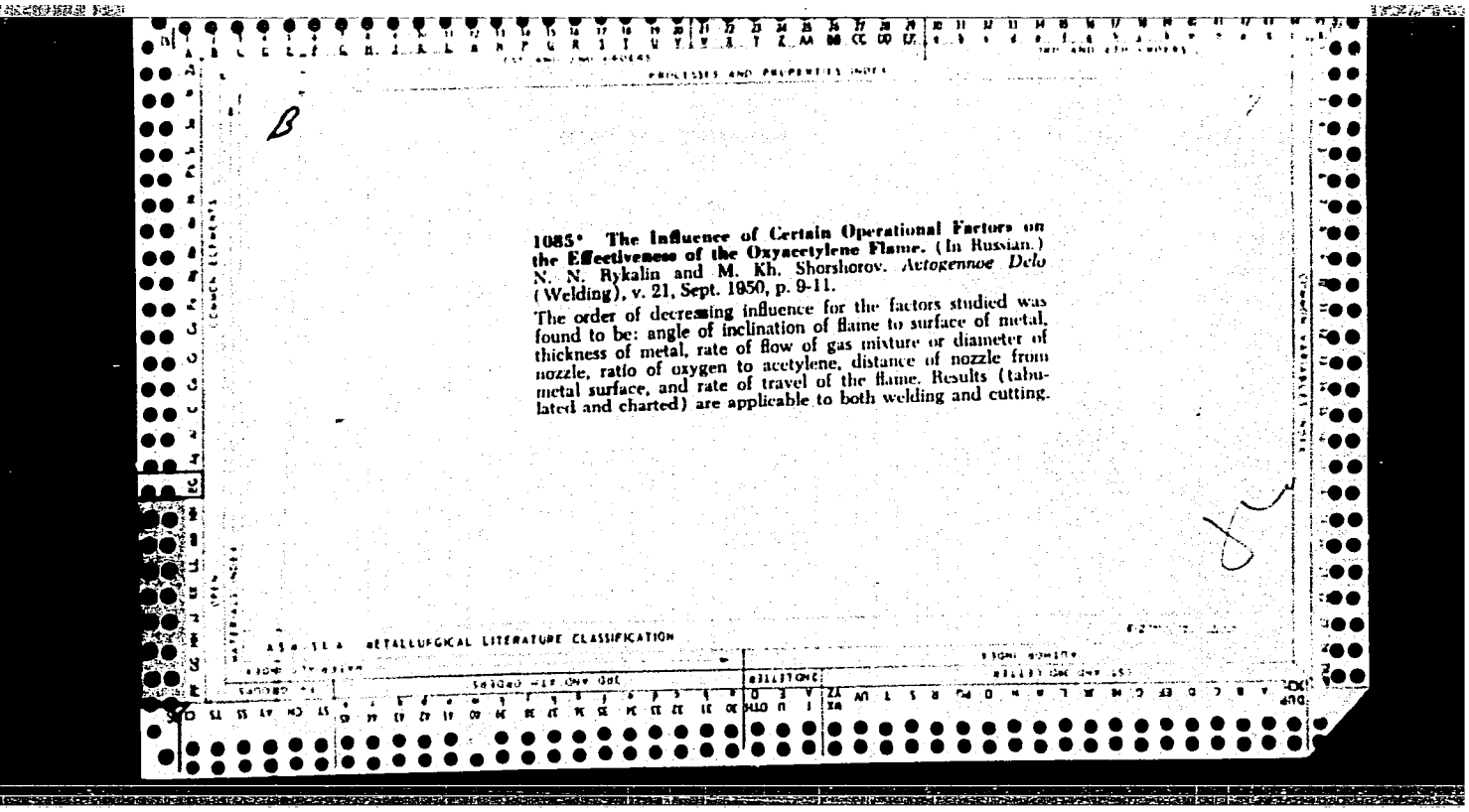

1085* The Influence of Certain Operational Factors on the Effectiveness of the Oxyacetylene Flame. (In Russian.) N. N. Rykalin and M. Kh. Shorshorov. *Avtogennoe Delo* (Welding), v. 21, Sept. 1950, p. 9-11.

The order of decreasing influence for the factors studied was found to be: angle of inclination of flame to surface of metal, thickness of metal, rate of flow of gas mixture or diameter of nozzle, ratio of oxygen to acetylene, distance of nozzle from metal surface, and rate of travel of the flame. Results (tabulated and charted) are applicable to both welding and cutting.

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

RYKALIN, N. N. PROF.

USSR/Metals - Steel, Welding, Processes Feb 52

"Distribution of the Heat Flow of a Welding Flame and Its Effect on Crack Formation in Heating Thin Sheets of 30 KhGS Steel," Prof N. N. Rykalin, Dr Tech Sci, M. Kh. Shorshorov, Cand Tech Sci

"Avtogen Delo" No 2, pp 3-7

Presents results of investigation by Sec for Sci Development of Problems of Elec Welding and Electrothermy, Acad Sci USSR, to det effect of character of heat flow distribution along surface of metal on temp field of limiting state and on formation of

212T84

cracks. Discusses inclination angle and movement direction of flame. Cromansil specimens 1 mm thick were used in expts. Suggests means for decreasing crack formation.

212T84

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

RYKALIN, N. N.

232T70

USSR/Metallurgy - Welding, Heating Jun 52

"Butt Heating of Bars With Stationary Flame of Multi-serial Torches," Prof N. N. Rykalin, Dr Tech Sci, M. Kh. Shorshorov, Cand Tech Sci, Section of Elec Welding and Electrothermy, Acad Sci USSR

"Avtogen Delo" No 6, pp 1-6

Discusses results of expts for heating steel bars and gives methods for calg process of metal heating and cooling. Butt heating is used in pressure gas welding of bar-type articles and thick-walled pipes, and also for surface hardening. Burner concentrates heat on required surface of workpiece and permits uniform and rapid-heating

232T70

of this surface. Productivity of welding is greater than in case of side heating.

232T70

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

RYKALIN, N. N. and Shorshorov, M. Kh.

"Temperature Distribution in the Gas Welding Flame, and Weld Cracking in Thin "Chromansil" Plate " (Avto. Delo, 1952, 23, Feb., p. 3)

Type 30 KhGS steel (Chromansil) is a difficult steel to weld, and cracking was observed in gas-welds in 1-mm. thick sheet. After studying the temperature distribution of the welding flame, recommendations were made to use the rightwards method of welding, and to use a special " in line " torch with a row of nozzles rather than a circle, thus elongating and narrowing the isotherms. This narrows the heat-affected zone and retards the cooling rate in the weld and weld junctions.

VI

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NIKALIN, N. N. Prof

Welding

Use of welding in the construction of the Lenin Volga-Don navigable canal, and on t other great communist construction projects. Avtog. delo 23 no. 9 1952

Monthly List of Russian Accessions, Library of Congress, November 1952, Unclassified

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

RYKALIN, N.N.

Development of the theory of heat diffusion in welding in relation to the distribution of the sources of heat. Trudy Sektsii po nauchnoi razrabotke problem elektrosvarki i elektrotermii Akademii nauk SSSR, no.2:3-9 '53. (MLRA 7:6)
(Welding)

APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5"

"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

RYKALIN, N.N.; KULAGIN, I.D.

Thermal parameters of the welding arc. Trudy Sektsii po nauchnoi razrabotke problem elektrosvarki i elektrotermii Akademii nauk SSSR, no.2:10-58 '53. (MLRA 7:6)
(Welding)

APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5"

"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

RYKALIN, N.N.; SHORSHOROV, M.Kh.

Heating thin metallic sheets and heavy products with the flame of a simple torch. Trudy Sektsii po nauchnoi razrabotke problem elektrosvarki i elektrotermii Akademii nauk SSSR, no.2:89-111 '53. (MLRA 7:6)
(Welding)

APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5"

"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

RYKALIN, N.N.

Rykalin, N.N.	"The Theory of Heat Processes in Welding of Metals"	Section for the Development of Scientific Problems of Electric Welding and Electrothermy, Academy of Sciences USSR

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

RYKALIN, N. N.

On Some Methods of Evaluating Low-Alloyed Steel Intended for Welded Constructions

The author points out the necessity of subjecting low-alloyed steel to special tests. He states that the best tests are those which strive to determine the influence of thermal action during welding on the mechanical properties and structure of the steel. He outlines a number of these mechanical properties which he feels should be carefully checked. (RZhMekh, No. 6, 1955) Tr. Vses. Nauch. Inzh.-Tekhn. o-va Metallurgov. Vol. 1, 1954, 116-123.

SO: Sum. No. 744, 8 Dec 55 - Supplementary Survey of Soviet Scientific Abstracts (17)

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

RYKALIN, N.

Basis of the heat expansion theory in welding, p. 46, ZVARANIE (Ministerstvo hutneho prumyslu a rudnych bani a Ministerstvo strojarstva) Bratislava, Vol. 3, No. 2, Mar. 1954

SOURCE: East European Accessions List (EEAL) Library of Congress, Vol. 4, No. 12, December 1955

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

RYKALIN, N.

Thermal processes in flux welding. Tr. from the Russian. p. 186.
ZVARACSKY SBORNIK, Bratislava, Vol. 3, no. 3/4, 1954. (Svaracsky sbornik)

SO: Monthly List of East European Accessions, (EEAL), LC, Vol. 5, No. 6, June 1956, Uncl.

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

RYKHALIN, N.N.

Welding technique in the German Democratic Republic.
Svar.proiz. no.12:21-26 D '55. (MLRA 9:2)

1. Institut metallurgii imeni A.A.Baykova AN SSSR.
(Germany, East--Welding)

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

AID P - 4825

Subject : USSR/Engineering

Card 1/2 Pub. 107-a - 11/13

Author : Rykalin, N. N.

Title : Report on proceedings of the 8th Conference of the International Institute of Welding, held in Zurich (Switzerland) in September 1955.

Periodical : Svar. proizv., 3, 27-28, Mr 1956

Abstract : A very concise presentation of activities of the Conference and the work of the Institute since its organization in 1948. The USSR delegates were there as "unofficial" observers, invited by the Swiss Committee for the organization of the conference. The Russians brought with them some literature and sample welds to show. Russian delegates had informal discussions with several leading members of the Institute on various aspects of welding.

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

AID P - 4825

Svar. proizv., 3, 27-28, Mr 1956

Card 2/2 Pub. 107-a - 11/13

Institution : None

Submitted : No date

APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5"

"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

AID P - 5059

Subject : USSR/Engineering-Welding

Card 1/1 Pub. 107-a - 8/9

Authors : Rykalin, N. N. and I. D. Kulagin (Institute of Metallurgy, Academy of Sciences, USSR)

Title : Welding practice in machine-building plants of Switzerland

Periodical : Svar. proizv., 5, 25-32, My 1956

Abstract : The authors report on the various welding practices in outstanding Swiss plants, such as Brown-Bovery, Sultzer, including a few plants making structural steel. Twenty one photos and 2 drawings.

Institution : As above

Submitted : No date

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

Rykalin N. N.

137-1957-12-24115

Translation from: Referativnyy zhurnal, Metallurgiya, 1957, Nr 12, p 173 (USSR)

AUTHORS: Rykalin, N. N., Kulagin, I. D.

TITLE: The Heating of the Rotary Electrodes of an Arc Rectifier (Nagrev vrashchayushchikhsya elektrodov dugovogo ventilya)

PERIODICAL: Tr. in-ta metallurgii AN SSSR, 1957, Nr 1, pp 211-227

ABSTRACT: The heat balance of a high-voltage arc rectifier (AR) was investigated within the range of the parameters of the AR system under investigation. The fraction of heat carried off by the water used to cool the electrodes amounts to 10-15 percent of the total arc capacity at the cathode and 20-25 percent at the anode; of the total capacity of the arc the air carries off 25-35 percent from the cathode and 20-30 percent from the anode. The consumption of coolant and air, the rotary velocity of the electrodes and the diameter of the jets essentially do not affect the primary components of the heat balance of the AR. In the process of burning, the arc breaks down into a number of separate strands, through the trails of which the major portion of the heat of the arc is introduced. A method is given for the computation of the temperature of an individual trail; the temperature is calculated as the sum of the

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The Heating of the Rotary Electrodes of an Arc Rectifier

mean temperatures of an electrode surface which has reached a steady thermal state, and of the local temperature brought about by the short-time action of a single impulse of the arc upon the electrode surface. The shape of the electrode was taken into consideration in the computation of the mean temperature, while the computation of the local temperature was based upon the concept of an immobile, continuously operating, normally circular heat source upon the surface of a massive body.

A. N.

1. Electrodes-Thermodynamic characteristics 2. Arc rectifiers-Heat transfer 3. Electric arcs-Temperature-Mathematical analysis

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

24-4-3/34

AUTHOR: Rykalin, N.N. (Moscow).

TITLE: Heating of rods during resistance butt welding. (Nagrev sterzhney tokom pri svarke vstyk soprotivleniyem).

PERIODICAL: "Izv. Ak. Nauk, Otd. Tekh. Nauk" (Bulletin of the Ac. Sc., Technical Sciences Section), 1957, No.4, pp.14-22 (USSR).

ABSTRACT: The author investigates analytically the heating during resistance butt welding, the distribution of the welding current, the distribution of the current near to the joint area, the heating near to the contact area, the heat generation and the heat propagation and he formulates the equations of the heating process. It is convenient to substitute the heating process by two independent heating sources, one expressing the heating effort which is uniformly distributed along the length of the rod and which changes slowly as a function of time, the other expressing the additional heating effort concentrated in the neighbourhood of the joint area and decreasing rapidly at the early stages of the process. The heating caused by both these sources is investigated. It is stated that the data derived analytically in this paper are in good agreement with experimental results obtained by Pugin, A.I. as regards the distribution of the temperature along the length of the rod at the end of the welding

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Heating of rods during resistance butt welding (Cont.)

process and the calculation of the thermal heating and cooling cycle at the near contact area. 24-4-3/34

There are 4 graphs; 6 Russian references.

ASSOCIATION: Institute of Metallurgy, Ac. Sc. (Institut Metallurgii Ak. Nauk SSSR).

SUBMITTED: December 30, 1956.

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

RYKALIN, N. N.

The laws of heating up of materials in resistance butt welding. Tr. from Russian.

P. 147 (Zvaracsky Sbornik) Vol. 6, No. 2, 1957, Czechoslovakia

SO: MONTHLY INDEX OF EAST EUROPEAN ACCESSIONS (EEAI) LC. - VOL. 7, NO. 1, JAN. 1958

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

RYKALIN N. N.

135-9-22/24

AUTHORS: Rykalin, N.N., and Shorshorov, M.Kh.

TITLE: Welding Technique in Great Britain (Svarochnaya tekhnika v Velikobritanii)

PERIODICAL: "Svarochnoye Proizvodstvo", 1957, # 9, p 40-44 (USSR)

ABSTRACT: The authors visited Britain in October-November 1956 on invitation by the British Welding Association and the West-Scotland Iron and Steel Institute. The article presents a report on this visit during which the authors got information on the activities of the British Welding Research Association and visited the Cambridge and the Birmingham Universities and six machinebuilding plants, and delivered reports on Soviet welding technique at two meetings in London. The report deals with organization of British technical education, equipment of university laboratories, and gives names of professors. The number of welding engineers trained in Britain is obviously too small, and according to British statistics, the Soviet Union has 230 engineers per one million inhabitants, USA - 130, and Britain - 18. The welding equipment and production of the six visited plants is described and the names of leading engineers are mentioned. In conclusion, the authors say that their incomplete impressions

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

RYKALIN, N.N.

AUTHOR: Rykalin, N. N. (Moscow) 24-9-14/33

TITLE: Development of welding technology in Czechoslovakia. (Razvitiye svarochnoy tekhniki v Chekhoslovakii).

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, 1957, No.9, pp.101-107 (USSR)

ABSTRACT: The largest establishment engaged in welding research in Czechoslovakia is the Welding Research Institute (Vyskumny Ustav Svaracsky, VUS) in Bratislava formed in 1951. The building of this Institute is not yet quite complete. In September, 1956 about 400 people were engaged in this Institute occupying about 14 000 m^2 of floor space. When completed the floor space is to increase to 45 000 m^2 and the personnel to a total of 1000 people. The Institute works in close cooperation with the Welding Technology Chair of the Bratislava Polytechnical Institute (headed by Academician J. Cabelka). The Institute is supplied with electricity through a 5000 kVA sub-station. After completion it will have available equipment for the entire metallurgical cycle from smelting and rolling right down to mechanical and heat treatment of all types. The tasks of the Institute will comprise development of new metal compositions, melting technology, production of all types of

Card 1/4

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Development of welding technology in Czechoslovakia. 24-9-14/33

metallic components for which various types of welding technologies are to be worked out and the strength of the welded structures investigated. This Institute can be considered as being an institute of metals and of welding. The author reviews the facilities of this Institute relating to the metallurgy of welding, welding technology, mechanical tests and the design office. In 1956 this Institute handled 85 researches; it derives 1% of the economy gained by introducing methods developed by them into industry. The Research Institute for Welding Machinery and Welding Technology (Vyzkumny-ustav Svarecskych Stroju a Technologie Svarovani, VUSSTS) in Prague with a branch in Chotebor is headed by Jan Prudky formerly of the Skoda Works; in Prague the Institute is scattered and has five different locations; in Chotebor it occupies a part of the floor space of an engineering works. The Institute disposes over a total floor space of 2000 m^2 and there are 174 employees. This Institute is concerned with investigation and development of designs of new types of machinery: automatic arc welding machines, supply sources for arc welding, contact welding machines and also equipment for gas welding and cutting. This Institute

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works under far more difficult conditions than the one in Bratislava. In spite of that it developed during the last 7 to 8 years about sixty types of contact welding machines which are being produced in small batches or in small series. The research section of the Vitkovice Metallurgical Combine has available a new building with a floor space of about 2000 m^2 containing a metallurgical, thermal, physical, X-ray, chemical and other laboratories which are as well equipped as those of the Research Institutes. The welding group is headed by K. Pavera and K. Mazanec and is concerned with the weldability of metals produced by the works, i.e. of the whole range of steels from low carbon to high temperature steels and in developing new grades of electrodes. The welding laboratory of the V. I. Lenin (formerly Skoda) Works in Pilsen serves the current needs of the Skoda Works and also carries out control tests. In the second part of the paper, pp.103-107, the author summarises papers read at the Fourth International Welding Conference held in Smolenice (Czechoslovakia) in September, 1956 which lasted three days and was attended by about 100 delegates including

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RYKALIN, N.N.

135-10-18/19

AUTHOR: Rykalin, N.N.

TITLE: Progress of Welding Engineering in Czechoslovakia (Razvitiye svarochnoy tekhniki v Chekhoslovakii)

PERIODICAL: Svarochnoye Proizvodstvo, 1957, No 10, pp 41-47 (USSR)

ABSTRACT: The author participated in the 6th International Welding Conference held in September 1956 in Smolenice, Czechoslovakia, called by the Slovakian Academy of Sciences, at which delegates from the USSR, East Germany, Poland, Hungary, Rumania, Bulgaria and Austria participated. The article presents information on the conference, on welding institutes and plants visited by the author as well as on welding equipment seen by him at the 2nd Exhibition of Czechoslovakian Machinebuilding in Brno which was open for 3 weeks in September 1956. Academician I. Chabelka reported on new welding methods in general; on his institute's work in the field of slag welding and welding of aluminum and aluminum alloys in shielding gases, and on the method of gluing aluminum parts. An experimental glued bridge of 12 m in length was shown at the exhibition in Brno. Engineer S. Yozifek reported on a three-phase arc welding method under development at the Institute for Welding Machines in Praha. Engineer R.Marek (Austria) spoke on welding with a

Card 1/6

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lying electrode ("Elin Hafergut" method). Engineer M. Gauner (probably Hauner of the plant imeni Lenin, formerly Skoda) in Plzen, reported on weldability of low-carbon and medium-carbon steel and low-alloy manganese steel investigated at his laboratory. Candidate of Technical Sciences K. Mazanets (of the Vitkovice Kombinat) reported on weldability of high-strength structural steel in connection with the formation of cracks. Engineer V. Pilous (Plant imeni Lenin, Plzen) delivered a report on weldability of chrome-molybdenum steel "X5M" with electrodes producing weld metal similar to the base metal. Doctor I. Nemets (Plant for high-quality steel in Kladno) reported on means of conserving intercrystalline corrosion resistance in welded joints of unstabilized chrome-nickel steel of type 18-8 with the use of a cooling water stream. The author of subject article spoke of thermal process in resistance butt welding. Professor F. Faltus of the Czechoslovakian Academy of Sciences spoke on the problems of welded structures. Experiments of Doctor A. Pukhner (Bratislava Polytechnical Institute) were mentioned which served for determining the influence of the internal tension stresses in a zone under static tension or under static compression on the ultimate strength of structures. The Research Institute for Welding in Bratis-

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lava (Director - Academician I. Chabelka) is the biggest of its kind in Czechoslovakia. It was founded in 1951. Upon completion, it will possess all equipment for a complete metallurgical cycle. The floor space of its buildings will comprise nearly 45,000 m^2. There will be a big industrial electric furnace, an industrial rolling mill, forging, stamping and extrusion equipment, machinery for drawing pipes, and oven for heat treatment. A uniquely designed universal 2,500 t press (with pulsating $\pm$ 500 t load) is being mounted (built by the plant imeni Lenin in cooperation with the plant Amsler, Switzerland). A heat resistance test device (600° C, 600 atm) is in operation. The Institute works on development of new metal compositions and melting technology, production of various types of metallurgical products for which new welding technologies are being developed. The Institute has an industrial workshop for electrode production. Three of its laboratories work on problems of the welding metallurgy (Engineer Sht. Gorvat). During the past years the Institute has achieved certain successes with contact welding machines for mass-production at automobile and aircraft plants. The basic task of the the Institute's design bureau consists of furnishing information and approving projects of welded structure made by

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Progress of Welding Engineering in Czechoslovakia

projecting organizations. During 1956, the Institute worked on 85 research tasks, all of which were preliminarily evaluated on a commercial basis. The Institute received 1% of the economy achieved by introducing its suggestions into industrial use. The Welding Chair of the Bratislava Polytechnical Institute (the aforementioned Academician I. Chabelka being the Head) retrains welding, mechanical, electrical and construction engineers, or metallurgists, who have not less than 2-3 years of practical experience. One course lasts 12 to 18 months. The Institute has a large and well organized technical library. I. Chabelka is also the managing editor of the welding periodical ("Zvaraniye") published in Bratislava. He heads the Laboratory for Machinebuilding and Technology of Metals of the Slovakian Academy of Sciences, which is located on the Institute's territory. The workers of this laboratory Doctor Kralik (changes of metal structures in welding) and engineer A. Gavalda (thermal processes in automatic and manual arc welding) are mentioned. The Research Institute for Welding Machines and Welding Technology (Director - Engineer Yan Prudki) in Praha and its branch establishment in Hoteborsh (Engineer D. Padevet), belong to the Ministry of Heavy Machinebuilding. This Institute works on new machine designs, developes and

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introduces new technologies, trains welding engineers, gives technical assistance to the industry. The laboratories in Parah and Hoteborzh are stated to be "very modest, even poor". The Institute has developed about 60 new types of contact welding machines and automatic arc welding devices during the past 7-8 years. All these machines are built in small series. The equipment for hand welding and for automatic arc welding used in the Czech machinebuilding and in construction industry was developed to a great extent by the Institute. The Vitkovice Metallurgical Kombinat in Strava produces rolled stock, sheet, pipes, standardized products for machinebuilding and shipbuilding, automobile wheels, large shafts, locomotive axles. Its Research Department, housed in a 2,000 m^2 building completed in 1955, has laboratories which have equipment equal to that of the laboratories of the research institutes. The welding laboratory (supervisors - the plant's chief technologist Engineer K. Pavera and Doctor of Technical Sciences K. Mazanets) works on weldability of metals produced by the plant and on new electrode types. The electrode workshop (Superintendent - Engineer Kalita) produces 3,000 tons of electrodes annually on two production lines. Facilities are available for production of high-quality electrodes in the shortest possible time. The

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majority of electrodes is produced in Czechoslovakia by the plant of the Ministry of Metallurgy in Vamberk, with an annual output of 10,000 - 12,000 tons. The Experimental Research Institute of the Plant imeni Lenin in Plzen is also mentioned. The welding laboratory of this Institute (Engineer Unger) successfully meets the needs of the plant. Furtheron, the article gives the technical characteristics of the following welding equipment shown at the Brno Exhibition: Universal welding tractor SUM-1000; automatic electric slag welding machine VUS-SV4; automatic welding machine for boiler joints SRK-300; universal welding tractor VUSCA266; universal automatic spot welders BP; miniature spot welder VUSB-1.5; suspension spot welder KP-60; multi-spot welding press VUS Multi-30; welding press VUS-250; seam welding machine BS; automatic suspension welding machine VUS-60/120 (for seam welding on automobile bodies); automatic butt welding machine TAU-80 and TAU-120; gas-pressure welding machine VUS-TS-51 (for reinforcement iron). The trade names and characteristics of welding dynamos and transformers shown in the exhibition are given in a chart. It is stated that Czechoslovak industry does not produce welding rectifiers. There are 12 photographs, 1 diagram and 3 charts.

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Card 6/6

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

RYKALIN, N. N.

AUTHORS: Rykalin, N. N. and Shorshorov, M. Kh. (Moscow). 24-10-9/26

TITLE: Welding science in Great Britain. (Nauka o svarke v Velikobritanii)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, 1957, No.10, pp.61-67 (USSR)

ABSTRACT: The authors were invited to visit Great Britain in October-November, 1956 and participated in a symposium on welding of low alloy steels for boilers and high pressure vessels in Glasgow and at the annual conference of the British Welding Institute in London. They report very exhaustively on the available research facilities in Great Britain and comment on these as well as on the teaching establishments, comparing conditions in Britain with conditions in the Soviet Union. Discussing the teaching, particularly at Cambridge and Birmingham Universities, the authors mention that the dissertations which they have seen there relate to a relatively narrow range of problems and, although they are well prepared and supported by extensive experiments, they do not have a wide scope. Comparing the Soviet "ordinary candidate dissertation" with those dissertations which the authors had the opportunity of seeing in Britain, they consider

Card 1/4

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evaluation of the tendency of steel to brittle fracture; problems of cold crack formation; methods of evaluation of the tendency to hot cracking of the basic and of the deposited metal during welding and application of welding in engineering. The authors summarise their impression thus: arc welding of stainless steel is extensively developed, particularly welding of aluminium in protective atmospheres, i.e. argon, helium and carbon dioxide (Quasi-Arc, Metropolitan Vickers, British Oxygen, Welding Research Institute, Birmingham University); the efficient process of electro-slag welding is almost not being used at all in British industry; a series of special automatic machines have been developed for arc welding under flux and inside protective atmospheres, for instance, for welding longitudinal seams in tubes, for welding commutators of electric motors (Metropolitan Vickers, Quasi-Arc); various manipulators and assembly-welding jigs are being produced by a number of specialised firms; small undertakings producing electrodes for arc welding are extremely well organised (Rockweld, producing up to 6000 tons per annum), the basic operations are highly mechanised, the personnel is very well utilised (good

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Welding science in Great Britain. 24-10-9/26

disposition of skilled labour) and the same applies to the production space. The authors consider that the Russians could learn from the British as regards skill in organising experiments so as to carry them out with a minimum expenditure of time, effort and materials. Equally, the Russians could learn from the British the extensive cooperation in scientific problems at meetings, conferences and committees. Although competing in the field of production, British welding specialists know each other well and cooperate in scientific developments. There are 2 figures and 3 references, one of which is Slavic.

SUBMITTED: May 17, 1957.

AVAILABLE: Library of Congress.

Card 4/4

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

RYKALIN, N.N.; OKERBLOM, N.O., doktor tekhn.nauk,prof.

Some trends in the development of the theory of welding processes.
Svar.proizv.no.11:13-16 N '57. (MIRA 10:12)

1. Chlen-korrespondent AN SSSR (for Rykalin).
(Welding research)

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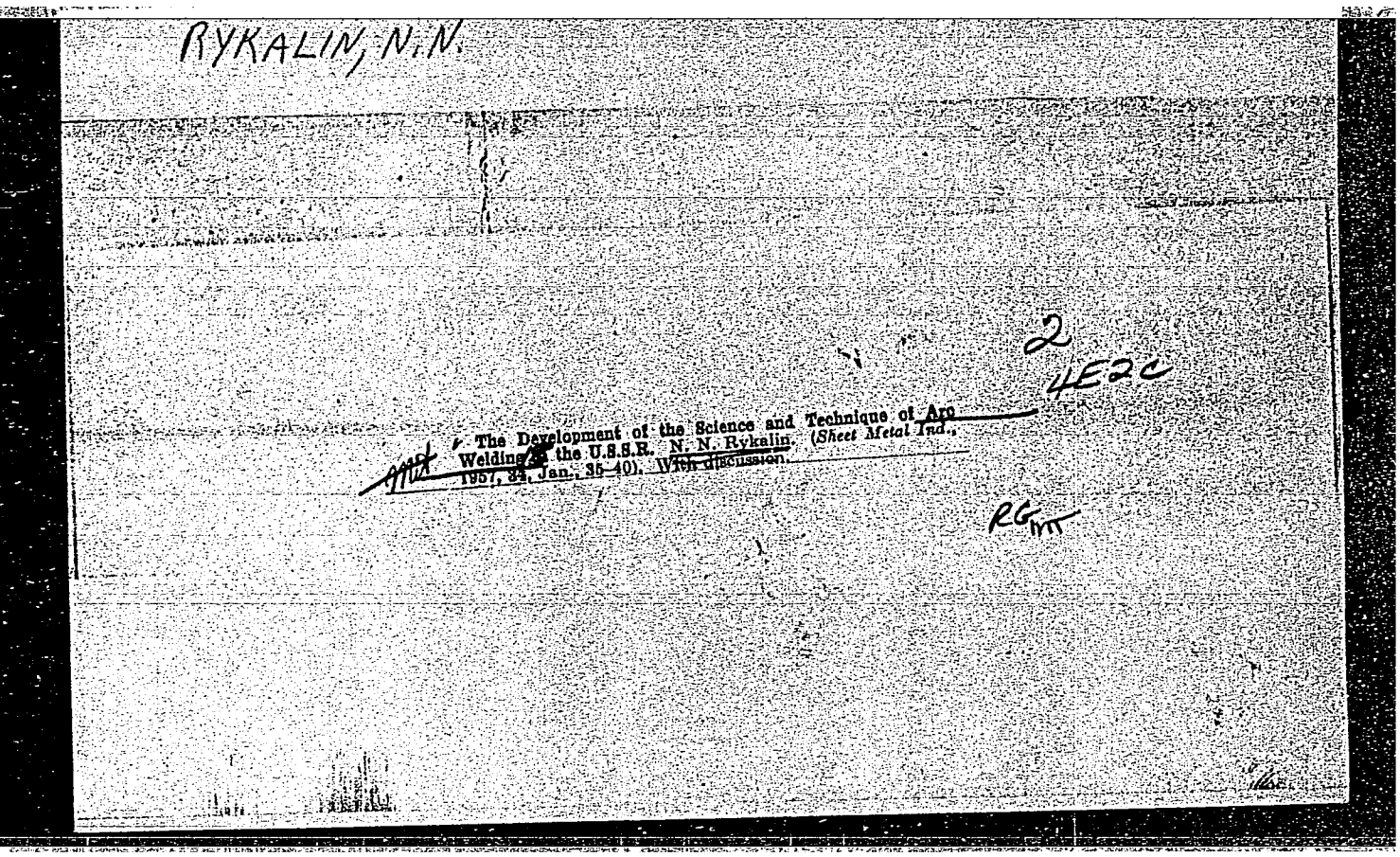

RYKALIN, N.N.

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The Development of the Science and Technique of Arc Welding in the U.S.S.R. N. N. Rykalin. (*Sheet Metal Ind.*, 1957, 34, Jan., 35–40). With discussion.

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

135-58-1-1/23

AUTHORS: Rykalin, N.N., Corresponding Member of the USSR Academy of Sciences, and Pugin, A.I., Candidate of Technical Sciences

TITLE: Calculation of Heating and Cooling of Rods in Butt Resistance Welding (Raschet nagreva i okhlazhdeniya sterzhney pri svarke vstyk soprotivleniyem)

PERIODICAL: Svarochnoye Proizvodstvo, 1958, Nr 1, pp 1 - 6 (USSR)

ABSTRACT: The authors develop methods of calculating the temperature distribution along the length of welded rods by the final stage heating and thermal cycle, in accordance with the theory of heat propagation in butt resistance welding. The tests were carried out with the MTP-150 machine. The current, potential difference between contacts, compression stress and shortening in the welding process were registered by an oscillograph. Temperature measurements were carried out by thermocouples of chromel and alumel wires, of 0.2 mm in diatmeter and were registered by a thermograph of the RP-49 type. Fundamental tests revealing the dependence of rated coefficients on the electric and mechanical regime parameters, were performed on low carbon steel (type 10 and ST.3) and silicon steel (0.45 to 0.5% Si.) samples.

Card 1/3

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Calculation of Heating and Cooling of Rods in Butt Resistance Welding

The density of current in these tests varied from 1,300 to 7,000 a/sq cm and the specific compression stress from 0.5 to 4 kg/sq mm. The welding time varied from 1 to 35 sec. The determined temperature distribution along the length of welded rods, obtained from the experiments, can be sufficiently accurately correlated with the theoretical temperature distribution. The authors describe the theory of calculating the heating process in detail. This linear process T (x,t) of heat propagation in the rod is described by a differential equation of heat conductivity with continuously operating, distributed sources. The heating process T (x,t) can easily be represented by the superposition of two independent processes T_1(xmt) + T_2 (x,t), which are caused: 1) by the source representing the work of a current uniformly distributed along the rod and slowly changing during the process (heating of a contactless rod), and 2) by the source, representing an additional work of the current concentrated at the end section during the early stage of the process. The calculation of additional temperatures for the final stage of heating is represented by monograms in (Figure 3). The authors then proceed to the calculation of regime parameters and thermal cycle. The welding regime is computed by assuming the

Card 2/3

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Calculation of Heating and Cooling of Rods in Butt Resistance Welding

contact temperature, choosing the rated coefficient (Figure 4) and determining the time of process according to the nomogram (Figure 5). Then, assuming the welding time, the density of current can be determined. Analyzing the results of the preceding theory, the authors arrive at the conclusion that the computation method of heating processes of rods, based on the linear process of liberation and propagation of heat, taking into account the concentration of the current in the end section and the linear increment of the specific metal resistance with temperatures, is in satisfactory agreement with the tests. There is 1 table, 1 figure, 5 graphs and 3 Soviet references

ASSOCIATION: Institut metallurgii imeni A.A. Baykova AN SSSR (Institute of Metallurgy imeni A.A. Baykov of the USSR Academy of Sciences)

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Card 3/3 1. Welding 2. Heat-Propagation-Theory

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RYKALIN, N. N.

Welding in the Soviet Union. p.45

VARILNA TEHNIKA. (Drustvo za varilno tehniko IRS in Zavod za varjenje IRS) Ljubljana, Yugoslavia. Vol.7, no.3/4, 1958

Monthly List of East European Accessions Index (EEAI) LC, Vol.8, no.11
Nov. 1959
Uncl.

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

KITAYGORODSKIY, Yu.I. (Moscow); KOGAN, M.G. (Moscow); KUZNETSOVA, V.A. (Moscow); RYKALIN, N.N. (Moscow); SILIN, L.L. (Moscow)

Ultrasonic joining of metals in a solid state. Izv. AN SSSR. Otd.tekh.nauk no.8:88-90 Ag '58. (MIRA 11:9)
(Ultrasonic waves--Industrial applications) (Metalwork)

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

SOV/24-58-11-41/42

AUTHORS: Krasovskiy, A. I. and Rykalin, N. N.

TITLE: 11th Congress of the International Welding Institute (XI Kongress mezhdunarodnogo instituta svarki)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, 1958, Nr 11, pp 149-151 (USSR)

ABSTRACT: Report on the Conference held in Vienna between June 28 and July 5, 1958.

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RYKALIN, N.N., otv.red.; RZHEZNIKOV, V.S., red.izd-va; RYLINA, Yu.V., tekhn.red.

[Hot cracks in welded joints, ingots, and castings] Goriachie treshchiny v svarnykh soedineniiakh, slitkakh i otlivkakh. Moskva, 1959. 163 p. (MIRA 12:6)

1. Akademiya nauk SSSR. Institut metallurgii. 2. Chlen-korrespondent AN SSSR (for Rykalin).
(Steel--Welding) (Steel ingots) (Steel castings)

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PHASE I BOOK EXPLOITATION SOV/3285

Akademiya nauk SSSR. Institut metallurgii

Teplovyye protsessy pri kontaktnoy svarke; sbornik trudov laboratorii svarki metallov (Thermal Processes in Resistance Welding; Collection of Transactions of the Laboratory for the Welding of Metals) Moscow, Izd-vo AN SSSR, 1959. 277 p. Errata slip inserted. 3,000 copies printed.

Ed.: N. N. Rykalin, Corresponding Member, USSR Academy of Sciences; Ed. of Publishing House: G. M. Makovskiy; Tech. Ed.: G. A. Astaf'yeva.

PURPOSE: This book may be of interest to engineers and researchers interested in improving the methods and machines used for resistance welding.

COVERAGE: The material is based on work conducted at the welding laboratory of the Institute of Metallurgy, Academy of Sciences, USSR, for the purpose of investigating thermal processes in resistance welding. A number of the papers present some results of theoretical and practical investigation of the butt welding of rods and the welding of crossed rods by the electric resistance method. Spot welding of sheet metal is also mentioned. Measuring and recording procedures are explained and illustrated. The majority of experiments deal with heating, heat distribution, and the flow of current in the welded part. It is

Card 1/ 6

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stated that the automation of industrial processes requires improved, specialized, and automated resistance welding processes. No personalities are mentioned. There are references, both Soviet and non-Soviet, at the end of each paper.

TABLE OF CONTENTS:

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Rykalin, N.N.

28(1) PHASE I BOOK EXPLOITATION SOV/2156

Soveshchaniye po kompleksnoy mekhanizatsii i avtomatizatsii tekhnologicheskikh protsessov. 2nd, 1956.

Avtomatizatsiya mashinostroitel'nykh protsessov; /trudy soveshchaniya/, tom. 1: Goryachaya obrabotka metallov (Automation of Machine-Building Processes; Proceedings of the Conference on Over-All Mechanization and Automation of Technological Process, Vol 1: Hot Metal-Forming) Moscow, 1959. 394 p. 5,000 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Institut machinovedeniya. Komissiya po tekhnologii mashinostroyeniya.

Resp. Ed.: V.I. Dikushin, Academician: Compiler: V.M. Raskatov; Ed. of Publishing House; V.A. Kotov; Tech. Ed.: I.P. Kuz'min.

PURPOSE: The book is intended for mechanical engineers and metallurgists.

COVERAGE: The transactions of the Second Conference on the Over-All Mechanization and Automation of Industrial Processes, September 25-29, 1956, have been published in three volumes. This book, Vol. I, contains articles under the general title, Hot Working of Metals. The investigations described in the book were conducted by the Sections for Automation and Hot Working of Metals, under the direction of the following scientists: casting - P.N. Aksenov, D.P. Ivanov and G.M. Orlov; forming - A.I. Tselikov, A.D. Tomlenov and V.T. Meshcherin; welding - G.A. Nikolayev, B.I. Frolov and G.A. Maslov. There are 183 references: 142 Soviet, 34 English, 6 German, and 1 French.

TABLE OF CONTENTS:

Card 6/8

APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5"

"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

RYKALIN N.N.

18(0) PHASE I BOOK EXPLOITATION SOV/2316

Akademiya nauk SSSR. Institut nauchnoy i tekhnicheskoy informatsii

Metallurgiya SSSR, 1917 - 1957; [t.] II (Metallurgy in the USSR, 1917 - 1957; Vol 2) Moscow, Metallurgizdat, 1959. 813 p. Errata slip inserted. 3,000 copies printed.

Ed. (Title page): I. P. Bardin, Academician; Ed. (Inside book): G. V. Popova; Tech. Ed.: P. G. Islent'yeva.

PURPOSE: This book is intended for metallurgists.

COVERAGE: The articles in this collection present historical data on the achievements of Soviet metallurgy, both ferrous and nonferrous, during the period 1917-1957. Advances in theory and practical application are thoroughly discussed. Many of the articles describe the present status of individual branches of metallurgy and give an idea of what may be expected in the future. Advances made in other countries are also discussed. The articles are accompanied by a large number of references. For further coverage, see Table of Contents.

Changes in engineering specifications and improvements in production techniques and quality of tires and solid wheels in the USSR since 1940 are discussed. Further progress in this field is predicted.

This is a historical survey of developments in forging and stamping processes in Russia from prerevolutionary times up to 1957.

The paper traces the general course of development and discusses problems in the theory of casting, casting alloys, basic melting processes, molding and core materials, nonmetallic molds, special casting methods (permanent mold casting, die casting, continuous casting, centrifugal casting, investment casting, etc.), equipment, mechanization, and automation.

The article is a general survey of the development and present state of powder metallurgy in the USSR. Theoretical and practical aspects of the preparation of cemented and sintered metal products are discussed.

The authors discuss the studies that have been made in the USSR of the theoretical aspects of welding, beginning in the latter part of the nineteenth century. Specific topics are: investigation of the arc,

Card 5/15

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25 (1)
18 (7)

SOV/135-59-4-2/18

AUTHORS: Rykalin, N. N., Corresponding Member of AS USSR;
Pugin, A. I., Candidate of Technical Sciences

TITLE: On Estimating the Intermittent Preheating of Rods by Current in Butt Welding by Fusion (Raschet preryvistogo podogreva sterzhney tokom pri svarke vstyk oplavleniyem)

PERIODICAL: Svarochnoye proizvodstvo, 1959, Nr 4, pp 4 - 7 (USSR)

ABSTRACT: The heat distribution process in rod ends, being fusion welded by intermittent electric resistance preheating, was experimentally studied on carbon steel specimens in the automatic welding machine ("MSGA-300") on carbonic steels "5" and ShKh-15, 30 - 60 mm in diameter. Calculation formulae were derived and nomographs plotted for practical engineering use, i.e. calculation of the welding process parameters and the power of the auxiliary electric current. The method is additionally explained with a practical problem: welding 30 mm diameter steel "st.5" rods that are to be intermittently heated to 1300°C on the contact surface.

Card 1/2

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SOV/135-59-4-2/18

On Estimating the Intermittent Preheating of Rods by Current in Butt Welding by Fusion.

Theoretical calculations of the process of intermittent heating proved to work satisfactorily. At intermittent preheating of rod ends to 1200 - 1300°C, with subsequent fusing of short duration, distribution of t_c in the contact area, attained by the end of preheating, changes during the fusion very little, when the average quadratic preheating current density varies from 525 to 1300 a/cm^2 and the area of welded profile varies from 7 to 28 cm^2.
There are 2 nomographs, 3 graphs and 1 table.

ASSOCIATION: Institut metallurgii im.A. A. Baykova AN SSSR
(Metallurgy Institute imeni A. A. Baykov, AS USSR).

Card 2/2

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

18(5) SOV/135-59-10-7/23

AUTHORS: Rykalin, N.N., Corresponding Member of the AS USSR, Pugin, A.I., and Vasil'yeva, V.A., Candidates of Technical Sciences

TITLE: Heating and Cooling Studs During Buttwelding by Friction

PERIODICAL: Svarochnoye proizvodstvo, 1959, Nr 10, pp 15-18 (USSR)

ABSTRACT: The authors present a study on some regularities of the heating process by friction of round studs with equal diameters during buttwelding. When heating by friction, the heat source is concentrated within a thin layer, fitting close to the end of the friction stud (Fig.1). The specific power q_2 cal/cm^2 sec. in point A (Fig.1v) is equivalent to the rotational power at a given point: $q_2 = Mfvp$, (2), where $M = 2{,}34.10^{-2}$ cal/kgcm, that is the thermic equivalent of mechanical work. The complete thermic rotation power is expressed by the equation:

$$q = \int_0^{d/2} q_2(r)\, 2\pi\, rdr = M\frac{\pi^2 n}{15}\int_0^{d/2} f(r)p(r)r^2 dr. \qquad (3)$$

Card 1/4

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Heating and Cooling Studs During Buttwelding by Friction

For calculation of the heating process, the following assumptions are made: The power of the rotation source, q cal/sec, is considered as constant during the heating time. The thermophysical coefficient of the material of both studs - heat conductivity λ cal/cm.sec ^{o}C, temperature conductivity a cm^2/sec, and thermal capacity c γ cal/cm^3 ^{o}C - are considered as not depending on the temperature, and their mean value within the examined temperature interval. Concerning the influence of surface heat elimination of the studs, these are considered as unlimited in length. The initial temperature is considered as zero (Celsius). The abscissa is put on the axis of the studs so that the sections at the ends form the ordinata. Time t is counted from the beginning of heating. Then the temperature T (x,t) of the studs is expressed by a proportion (N.N. Rykalin, Raschety teplovykh protsessov pri svarke (Calculations of Thermal Processes when Welding), Mashgiz, 1951). The integral in this case is expressed by the function

$$\text{ierfc } u = \int_u^\infty \text{erfc } u\,du = \frac{1}{\sqrt{\pi}} \exp(-u^2) - u \text{ erfc } u;$$ decreasing

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Heating and Cooling Studs During Buttwelding by Friction

on the positive axis from the value $\pi^{-\frac{1}{2}} = 0.5642$ at $u = 0$ to zero at $u = \infty$ (Fig.4):

$$T(x,t) = \frac{q_2 \sqrt{t}}{\sqrt{\lambda c \gamma}} \text{ ierfc } \frac{x}{2\sqrt{at}} . \qquad (6)$$

The temperature of the contact section ($T(0,t)$) is expressed by the first factor of equation 6:

$$T(0,t) = \frac{q_2 \sqrt{t}}{\sqrt{\pi \lambda c \gamma}} , \qquad (7)$$

The temperature in the state of equalization at the end of heating during the time t_k is calculated using equation 9:

$$T(x,t) = T(x,t) - T(x,t-t_k); \; t \geqslant t_k . \qquad (9)$$

For the contact section, the temperature in the process of equalization is expressed by equation 10:

$$T(0,t) = \frac{q_2}{\sqrt{\pi \lambda c \gamma}} \left(\sqrt{t} - \sqrt{t - t_k} \right); \; t \geqslant t_k . \qquad (10)$$

The temperature of the contact sections in the state of heating and in the state of cooling through a low heating temperature T_k

Card 3/4

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Heating and Cooling Studs During Buttwelding by Friction

and its duration t_k is expressed with the help of equations 7 and 10 (Fig.8). In the state of heating: $\frac{T(t)}{T_k} = \sqrt{\frac{t}{t_k}}$; $t \leqslant t_k$. (11)

In the state of cooling: $\frac{T(t)}{T_k} = \sqrt{\frac{t}{t_k}} - \sqrt{\frac{t}{t_k}} - 1$; $t \geqslant t_k$. (12)

By introduction of the factor θ (the proportion between T_k & T_n) equation 15 is given for the speed of cooling w^oC/sec:

$$w(T) = \frac{T_k}{t_k} \cdot \frac{2\theta^3}{1-\theta^4} \quad , (15), \text{ by equation 13}$$

and 14 (Fig.9). There are 1 diagram and 8 graphs.

ASSOCIATION: Institut metallurgii imeni A.A. Baykova AN SSSR (Metallurgical Institute imeni A.A. Baykov, AS USSR)

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001446420005-5

4 (0), 16 (1)

AUTHOR: Rykalin, N. N., Corresponding Member, AS USSR

SOV/20-125-3-14/63

TITLE: On the Conditions of Splitting [illegible] Solutions of a Linear Parabolic Equation Into Orthogonal Components (Ob usloviyakh rasshchepleniya resheniy lineynogo parabolicheskogo uravneniya na ortogonal'nyye sostavlyayushchiye)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 125, Nr 3, pp 519-522 (USSR)

ABSTRACT: A variation of the scalar $u(P_n, t)$ proceeds in the volume V of an n-dimensional space which is not limited or limited by a hypersurface S_n. This variation can be described by a linear parabolic equation with independent sources $w(P_n, t) : \frac{\partial u}{\partial t} = A_n u + w$, $P_n \in V$, $-\infty < t < +\infty$. A_n denotes a linear operator of the second order over n orthogonal coordinates $x_1, \ldots, x_n$ of the point $P_n = A_n = \sum_{i=1}^{n} \left(a_{ni} \frac{\partial^2}{\partial x_i^2} + b_{ni} \frac{\partial}{\partial x_i} \right) + c_n$. The condition on the

Card 1/3

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On the Conditions of Splitting of the Solution of SOV/20-125-3-14/65
a Linear Parabolic Equation Into Orthogonal Components

boundary S_n without limiting the generality may be assumed to be linear and homogeneous: $\frac{\partial u}{\partial n} + f_{ni} u = 0$, $P_n \in S_n$, $-\infty < t < +\infty$. The coefficients a_{ni}, b_{ni}, c_{ni}, and f_{ni}, $i = 1,\ldots,n$ depend on the coordinates of the point P_n and on the time t. At least one of the coefficients a_{ni} is different from zero in the whole given region. The author determines the conditions under which the scalar $u(P_n, t)$ is split into orthogonal components, i. e. expressed by the product of the scalars $u(P_n, t) = u_k(P_k, t).u_m(P_m, t)$, $k + m = n$. These scalars depend on the k coordinates $x_{k+1},\ldots,x_n$ and the time; further, they satisfy equations and boundary conditions of the same type, but for a less number of dimensions. The various parts of the present paper deal with the following problems: process in an unlimited region, process in a limited region, theorem of splitting, protractedly acting sources. The author then discusses the laws of

Card 2/3

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On the Conditions of Splitting of the Solutions of a Linear Parabolic Equation Into Orthogonal Components

SOV/20-125-3-14/63

application. The theorem of splitting permits the finding of an expression for the spatial equilibration processes (unsteady heat conduction, diffusion, filtration, multiplication of neutrons, etc). In the case of distributed sources, these equations can be described by linear parabolic equations. Some previous papers concerning this subject are mentioned. Some engineering problems of heat conduction in bodies of simple shape which are connected with a local influence of heat sources may be solved according to the theory of splitting. At last, a practical example is calculated. There are 5 references, 4 of which are Soviet.

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Card 3/3

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AUTHORS: Bochvar, A. A., Academician, AS USSR, Rykalin, N. N., Corresponding Member of AS USSR, Prokhorov, N. N., Professor, Doctor of Technical Sciences, Novikov, I. I., Candidate of Technical Sciences, Movchan, B. A., Candidate of Technical Sciences

TITLE: On the Problem of "Hot" (Crystallization) Cracks

PERIODICAL: Svarochnoye proizvodstvo, 1960, No. 10, pp. 3-4

TEXT: Information is given on results of investigations made by various authors on the technological strength of metal against hot crack formation. The following basic points in the problem of crystallization cracks are stated: 1. In analyzing the technological strength, two main peculiarities of the conditions in which this strength manifests itself during welding and casting processes must be taken into account: a) the technological strength appears during the cooling of the work when phase transformations in the metal and structural changes take place, b) the technological strength manifests itself under conditions of mutually equilibrated stresses, i. e. when stresses in the zones of local changes in the specific volume of the cooling metal are balanced

Card 1/3

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On the Problem of "Hot" (Crystallization) Cracks

by stresses arising in the adjacent zones. 2. Crystallization cracks arise in the crystallization range of the metal and may develop in the solid state during cooling. A sharply pronounced drop of ductility of the alloys, named the temperature range of brittleness, is observed in the "effective" crystallization range. The basic mechanism of plastic deformation in the liquid-solid state consists in the mutual displacement of crystallites. The upper limit of the "effective" crystallization range is the temperature of interlacing and coalescence of the dendrites; its lower limit is the temperature range of brittleness. When passing through this range, the deformation mechanism changes abruptly and plastic deformation of the crystallites develops intensively together with intercrystallite displacement. 3. The theory of the technological strength in welding and casting must be based on the comparison of processes of deformation and changes in ductility. The notion that the alloys are not ductile in solid-liquid state is not correct. The alloy being in solid-liquid state has, within the temperature range of brittleness, a ductility which is characterized by small values of relative elongation. It was experimentally established that the relative elongation of the alloy in the "effective" crystallization range was commensurable with the deformation in this zone. It is precisely the ductility of alloys in solid-liquid state that ensures the technological strength

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On the Problem of "Hot" (Crystallization) Cracks

in welding and casting, and data on the ductility of the alloys in this state permit the evaluation of their technological strength. 4. The technological strength reserve in casting or welding depends on the correlation between the temperature range of brittleness, ductility in this range, and the intensity of elastic-plastic deformation increasing with dropping temperature. All these three values must be considered when evaluating the strength reserve. 5. Changes in crack sensitivity can be determined by one of the characteristics if the two others remain constant. 6. Cracks in casting may be filled up by hydrostatic pressure and capillary forces. 7. Factors determining the temperature range of brittleness ductility and the deformation rate are enumerated.

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RYKALIN, Nikolay N. Institute of Metallurgy imeni A. A. Baykov, Moscow; Corresponding Member, Academy of Sciences USSR.

"Heat Sources, Heat Flow and Heat Effects in Welding".

report to be submitted for the American Welding Society (AWS), 42nd Annual Meeting, New York, N.Y., 17-21 Apr 61.

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RYKALIN, N.N., otv.red.; GIRYAYEVA, V.A., red.izd-va; MARKOVICH, S.G., tekhn.red.

[Melting of the base metal in welding] Protsessy plavleniia osnovnogo metalla pri svarke. Moskva, 1960. 165 p. (MIRA 14:2)

1. Akademiya nauk SSSR. Laboratoriya teorii svarochnykh protsessov. 2. Chlen-korrespondent AN SSSR (for Rykalin).
(Electric welding)

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AUTHOR: Rykalin, N.N.

TITLE: The efficiency and effectiveness of fusing metals by the welding arc

PERIODICAL: Referativnyy zhurnal. Metallurgiya, no. 1, 1962, 4, abstract 1E21 (V sb. "Protsessy plavleniya osnovn. metalla pri svarke", Moscow, AN SSSR, 1960, 5 - 70)

TEXT: The following conclusions are made on the basis of the study of the efficiency and effectiveness of metal fusion process by the welding arc: 1) the fusion of welded edges can be considered theoretically as the result of the welding arc heat propagation in the workpiece conditioned by the laws of heat conductivity; 2) to develop the theory of the fusion process, it is necessary to take into account the type of the arc heat distribution over the surface and the depth of the workpiece; 3) the theory of the heat propagation processes establishes the quantitative relation between the dimensions and outlines of the zones heated over the given temperature, including the fusion zones, thermal effect and plasticity on one hand and the welding conditions on the other hand; 4) the width

Card 1/4

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The efficiency and effectiveness of fusing ...

of the fusion zone by a powerful high-speed carbon arc of a constant length is proportional to the square root from the ratio of the current to the speed of arc displacement. The width of the fusion zone on the automatic welding machine under flux layer at a constant current and welding speed is, to the 1st approximation, direct proportional to the arc voltage; 5) the fusion zone outlines, determined by microsections of cross-sections of welded beads, at an open arc manual build-up (space factor z/n 0.6 - 0.8) are better described by the scheme of a linear source of a finite width on the surface of a semi-infinite body (z/h 0.77-0.9) than the zone outlines at automatic build-up under flux layer (z/h 0.4 - 0.6); for the theoretical description of the latter zones it is advisable to allow for the depth of the heat source; 6) the thermal effectiveness of the fusion process is characterized by the thermal efficiency η_{fus} of the process, representing the ratio of the rated heat content of the base metal fused in the time unit $g_{fus} S_{wel}$ to the heat power of the welding arc 0.23 UI. The thermal efficiency of the process is equal to the product of the arc heat utilization coefficient in the workpiece η_u by the thermal efficiency of the process η_t; 7) the thermal efficiency of the fusion process at welding, like the more general efficiency of the workpiece heating process over the given temperature, characterizes the effectiveness of the utilization of the heat energy introduced by a moving con-

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